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ILLUSTRATIVE HANDWORK



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A LAPLAND HUT

From Sixth Grade, Columbia, Mo. (See Project III. Page 145.)

ILLUSTRATIVE HANDWORK

FOR

ELEMENTARY SCHOOL SUBJECTS

A DESK MANUAL

FOR

CLASSROOM TEACHERS

BY

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PREFACE

THE studies which form the basis of this book were undertaken, not so much to prove the value of the methods, as to test the extent of their usefulness under the conditions existing in the ordinary school. Illustrative methods in various forms have, for some time, formed a regular part of the work in many progressive schools, but in some quarters the impression has prevailed that their usefulness is possible only under especially favorable conditions. A report of these studies was first submitted as a Master's Thesis in the Graduate School of the University of Missouri. Some of the principles upon which these studies are based are further discussed in a bulletin recently issued by the Manual Arts Department of the University of Missouri. The list of projects described in this book includes also many problems worked out in Columbia and other towns as a part of the everyday program and not as special studies. All of the projects here described were carried out in the regular classroom by the regular teacher under conditions common to the average school.

The suggestions offered apply to schools which are working under the limitations of restricted space, scant materials, and a more or less rigid course of study. These outlines and suggestions are offered, in the hope that it may help to bring into all classrooms greater freedom for both teacher and pupil, greater opportunity for the development of resourcefulness and independence in thought and action, and last, but by no means least, to bring the real joy of activity into some classrooms that have known before only mechanical routine. Grateful acknowledgment is here made to the teachers of the Columbia schools for their loyal support and enthusiastic coöperation, and to Dean W. W. Charters for assistance in the organization of the material.

ELLA VICTORIA DOBBS.

UNIVERSITY OF MISSOURI,
June, 1916.

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ILLUSTRATIVE HANDWORK

CHAPTER I

THE POINT OF VIEW

INTRODUCTION

THE point of view is always important. Many of our heated and futile discussions, many of our misunderstandings and estrangements, are due to the fact that two of us have seen the same thing from different angles and each has pitied or blamed the other for blindness without appreciating the keenness of his observation. Again, many of our endeavors are blocked and our resources seem to be exhausted until we happen upon a new point of view which opens up a new mode of attack or another avenue of approach and we are able to move forward with vigor and success.

Handwork as a school subject is so new that its advocates are still far from agreed either as to its subject matter, its methods, or its purpose. Different groups in turn advocate a form which emphasizes marketable skill, a form which allows free rein to originality and inventive genius, a form which will produce useful articles for home and school, a type

which deals with the immediate interests of children and allows them "to make what they want to make," and so on. Reasonable arguments are brought forward in support of each of these legitimate but conflicting aims, and it seems impossible to meet all these needs in a single course of study. Nowhere is this confusion so marked as in the elementary field, and nowhere is the need for a new point of attack more keenly felt.

Handwork of all sorts is commonly classed as a special subject, the work being done at a specified time with special tools and material, and frequently in a different room under a specially trained teacher where the projects undertaken have no direct relation to any of the *regular* classroom work of the pupils. This point of view is the inevitable accompaniment of the newness of the subject, but as we become better acquainted with the value and possibilities of the work, we discover the narrowness of this view. We have begun to realize that handwork is valuable not only for its product in things made, but also for the effect upon the maker; that it is not only a subject to be studied for its own sake, but may be a helpful method of studying other subjects; that it is not only an end in itself, but that it is also a means to an end.

As soon as we accept the premise that handwork has two distinct functions in the curriculum, many of our difficulties in organization disappear. If we

accept this premise frankly, the problem at once divides itself into two general propositions: First, the handwork which is general in its application and free in its methods without emphasis upon technical

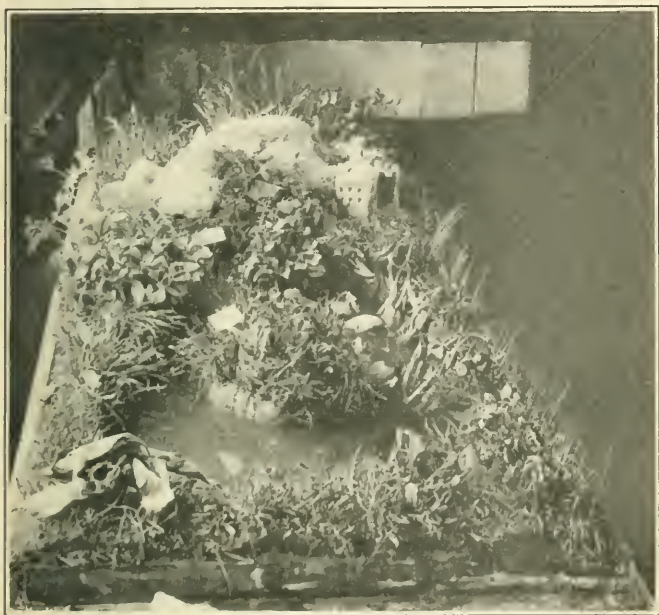


FIG. 1. — The Lady of the Lake. Sandtable Illustration. Sixth Grade, Columbia, Mo.

processes ; and second, that which is specific and restricted by commonly accepted professional practice. The conditions involved in the former type of work, which seeks to develop originality and inventive genius through free expression, are radically different from the conditions involved in the second type,

which seeks to develop skill and accuracy in any given process. Both types of work are essential in a well rounded course of study, but cannot be taught by the same method nor at the same time. The former may be, and is largely, a part of regular classroom experience under the guidance of the regular teacher, to be used chiefly as a medium of expression for ideas gained in the study of other subjects. The latter deals chiefly with technical processes and the conditions involved in carrying them out, and must always remain the province of the technically trained teacher.

The projects outlined in this book belong wholly to the former or expressional type of handwork and are further limited to forms of work which are illustrative in character and grow out of the regular or traditional subjects in the curriculum.

Much of the material here used is drawn from a series of studies, carried out in the public schools of Columbia, Missouri. These studies were carried on in regular classrooms under conditions common to the average public school. The projects grew out of the subject matter prescribed by the regular course of study and were made a part of regular class work.

These studies were undertaken to prove :

(1) That illustrative handwork can be used profitably as a *method of study* by giving the children something to do which they will wish to do but which

cannot be done successfully without a practical knowledge of the subject matter to be studied.

(2) That illustrative handwork can be used profitably as a *method of recitation* by requiring the children to make something which they cannot make successfully unless they have gained clear and definite ideas of the subject which has been studied.

(3) That work of this kind not only has a place as a regular form of study and recitation but that it can be done without exceeding the limit of time allotted to the subject.

(4) That the equipment and materials needed are easily obtainable in any school.

(5) That work of this kind may be carried on in the regular classroom.

(6) That such methods may be used by teachers who have not been trained in the Manual Arts.

ILLUSTRATIVE HANDWORK

Scope and Justification. — In carrying on the studies which furnish the material for this book, certain educational values, more or less generally accepted, have been assumed in justification and limitation of the projects undertaken.

First, it is assumed that varying mental capacities demand a variety of means of expression sufficient to allow each child to express himself with comparative ease through at least one medium.

In a large proportion of schools a pupil's progress

is measured only by what he can say with his tongue or pen, utterly disregarding what he might tell with his hands. For example, in any given class there is likely to be at least one who talks glibly and makes a good showing in oral recitations but fails utterly in an attempt to write out a connected statement of the same topic. There is apt to be another whose diffidence makes him fail in an attempt to talk but who can express himself clearly in writing. There is likely also to be a third pupil who finds himself at a loss in using words, either oral or written, but who can "show you how it was" if given an opportunity to handle tangible material. When, for example, this last-named pupil has made a clever representation on the sand table, the teacher is apt to say to the admiring visitor, "Oh, yes, John can do such things, but he can't do anything else," in a tone which implies that John's ability to express his ideas through his fingers is of much less value than Henry's ability to talk or write. In life outside of school we place a premium upon ability to do, and it is deeds rather than words which succeed in the battle of life. In the classroom where no opportunity for concrete expression is offered, the child of the third type described above is prone to become discouraged and to regard himself as such a hopeless dunce that extended school attendance is a waste of time. If he succeeds in life in spite of a scant amount of schooling, he is apt to join the ranks of

those who oppose all higher education. It is a good thing for such a pupil sometimes to feel a thrill of pride in having surpassed his classmates instead of always being outstripped by them. Such an experience sometimes helps to overcome obstacles in the way of his success in other forms of expression. His interest in the thing he has made overcomes his



FIG. 2. — Gold Mining in California. Fifth Grade. Columbia, Mo.

By means of a small lake near the top of the mountain and a rubber tube, a fair impression of placer mining was given.

diffidence, and he tells easily how the work was done and what it implies. It is also a good thing for all the class to feel that material things and the control of them have value as well as has book-lore.

From any point of view it seems but the statement of a self-evident truth to assume that the school should employ such a variety of mediums of expression that each pupil could use at least one of them with fair success; thus, encouragement is given him

to try again, and the process of finding himself is facilitated.

It is assumed also that concrete illustration is an aid to clear thinking, first to the worker, in that he must think more definitely than is necessary for mere verbal expression, since he must literally "give shape to his thought"; and second, to the observer, in that the graphic nature of the illustration brings out relationships more vividly and conveys a greater sense of reality than is possible through printed descriptions only.

Our common acceptance of this point of view is attested by the increase in the number and quality of pictures used in connection with all forms of printed matter. The modern architect adds to the flat plans for his house, a cardboard model of it; and to impress the prospective builder still more, he models the contour of the grounds in *papier-maché* and gives the tiny house its proper setting. At fairs and expositions and in store windows such representations always attract crowds of observers. If these illustrations are interesting and helpful to adults, they are even more helpful to children in whom the power of abstraction is still less developed, and the school should eagerly adopt every available means to simplify and intensify the educative process. Mark Twain, in an article entitled, "Making History Dates Stick,"¹ sets forth in his own delight-

¹ *Harper's Magazine*, December, 1914. Vol. cxxx, p. 3.

ful fashion the value of picture-making as an aid to memory, and in semi-serious manner emphasizes a psychological truth in his repeated and italicized admonition, "But you must make the pictures yourself."

In the third place, it is assumed that the making of concrete illustrations causes the student to read with more interest and earnestness when he is seeking information for which he has immediate use than when he is without such motive; and that information thus gained and used makes a more lasting impression than would otherwise result.

The early reading of children is concerned so largely with the mastery of technique, with mere ability to pronounce words, that it is important to give them, as early as possible, a motive which will emphasize the thought which the words convey. The child who is trying to make a Japanese house, a Dutch windmill, or an aeroplane, turns again and again to the printed description to find out how to complete his project, and he must read intelligently and think clearly before he can reach a satisfying degree of success. This necessity and the struggle to meet it cannot fail to make a more lasting impression than does an ordinary class recitation.

It is assumed in the fourth place that the necessity for giving tangible expression to ideas, combined with interest in making things which appeal to the worker as worth while, develops resourcefulness,

both in use of materials at hand and in the search for other materials.

One common criticism of our modern emphasis upon interest as a factor in education is that through its use, or misuse, we have made school work so easy that children balk at an attack upon any hard problem.



FIG. 3. — Valley Forge. Sixth Grade. Columbia, Mo.

If, however, the project is one in which the pupil is vitally interested because it is on the level of his own experience and appeals to him as real and worth while, there seems no limit to the energy he will put forth to accomplish success. Various materials are turned to account and unexpected values are discovered in them which give to the worker an added feeling of power and not only encourage him to explore new fields in search of material with which to

perfect his project but also make him alert to discover the various uses to which materials may be put. Even though these energies may be directed toward ends which have small value from an adult or commercial point of view, they help in establishing habits of thought and action which have broad application and carry over into many fields of activity.

It is further assumed that coöperative effort in interesting work tends to develop a spirit of mutual helpfulness.

In the ordinary lesson each pupil is concerned primarily with his own success. In group-projects, ultimate success depends upon coöperation among the workers. Each pupil feels a greater responsibility for performing his part well when other parts depend upon it, than when it is purely an individual matter. Each member feels a responsibility for the group and he is anxious to help the weaker members. The occasional delinquent who sees in the group-project a chance to shirk responsibility, is apt to be reproved and helped in most effective ways by his mates. Actual practice indicates, however, that the shirkers are greatly outnumbered by those who are ready to do more than a fair share of the work.

Relation between Technical and Expressional Handwork. — If we include in the term technical handwork all projects which involve technical skill on the part of the worker and which depend for their success upon the quality of workmanship displayed,

it goes without saying that such work to be fully successful requires the direction of a skilled teacher well versed in the technique of the processes he teaches. It is also self-evident that work of this type demands a definite time at which the pupil's entire attention shall be given to the mastery of the processes involved. Such work presupposes a definite project through which the pupil shall be *taught how* to do the work in the best and most economical manner as determined by professional or trade practices, and in which he shall be held to as high a standard of excellence in workmanship as the conditions warrant.

Work of this sort is usually organized in courses involving a certain material or a certain set of tools, as leather, metal, cardboard, or bench work, book-binding, coping saw work, etc. These courses are the special subjects to which reference has been made and in many schools are the only forms of handwork in use.

A recognition of other values to be gained through the use of handwork in no way belittles the value of technical training. It but adds another tool with which to make the teacher's work more effective and it increases the usefulness of motor activities. It is important, however, that the relationship between these values be clear in our minds and that each be kept in its legitimate field. Handwork for the sake of the thing to be made is one thing. Handwork for the sake of being able to make, *i.e.* skill, is another.

Handwork for the sake of the personal effect upon the worker is still another, and is always important, if not the most important.

When skill of hand is the purpose in view, attention must be centered in the actual tool processes and the thing to be made is of secondary importance. That is, if skill in planing is the thing desired, it does not matter greatly whether it comes through making breadboards or hatracks, but it is of prime importance that the worker handle his plane in the most effective way. It is not only important to obtain a good result, but it should be gained by the best means. When, however, the project in hand is an illustration for a geography lesson, its chief purpose is to teach the geography lesson in the most efficient and effective manner. It is desired only to make certain facts and conditions stand out boldly in the pupil's mind and to deepen the impression by adding muscular sensations to those received through eye and ear. Under such conditions the technical process of handwork is of secondary importance and the method of holding saw or plane may be passed over that attention may be centered in the general effect to be secured.

The great business of little children is to become acquainted with the world about them. This includes a general knowledge of materials, how they behave, what purpose they will serve, and how they may be controlled. It seems reasonable therefore

that the handwork for the lower grades should deal with a variety of materials with which children may experiment quite freely in order to gain first-hand experience in what can be done with them.



FIG. 4. — The Bear's House. Training Class. Missouri University.

The most prominent characteristic of little children is their restless activity and constant desire to be doing something. The successful program of education must recognize this activity in two ways. First, the physical necessity for activity for growing children demands an organization of methods which

will provide for such activity as a regular part of school work and not merely as rest or recreation. Second, even apart from the appeal to the interest, the importance and value of learning to do by doing would seem to warrant greater emphasis than is usually given to motor expression as an effective method of teaching.

Little children, when they first enter school, are unconscious of any need for skill and are therefore not ready for technical handwork. The desire for skill must be aroused through desire for a thing which requires skill. Whether a plant label is five inches long or misses that measurement by an eighth of an inch does not materially interfere with its usefulness as a plant label, and the pupil is inclined to attribute what seems to be an arbitrary demand for accuracy to the teacher's general fussiness. A spool top which will not spin because the stalk is too long, sets its own standard of accuracy and not only creates a desire for better work but suggests the means. It seems reasonable that the early projects in handwork should be drawn from the field of the child's immediate interests and should deal with things which he wants and is glad to put forth effort to secure, and which at the same time will be unsatisfactory to him unless they are fairly well made. Such projects not only set their own standards of excellence but tend to establish habits of success, instead of failure.

If these characteristics of children are recognized

in the organization of an educative program, it follows that the work for the lowest grades must permit the maximum amount of freedom in the manipulation of a great variety of materials. Courses in raffia, paper, clay, or any other single material in which emphasis must be placed upon a technical process, cannot fill this requirement, since they offer scant opportunity for free experimentation. Neither can such courses be justified from the standpoint of physical activity, since most of the work may or must be done while sitting at the desk. Still less can such courses be justified from the standpoint of free self-expression, since the nature of the work usually demands a method of dictation until processes are memorized.

Such courses, when offered too early, develop a habit of dependence upon the teacher's leadership and a tendency to wait until shown how to do, before any effort is put forth. This attitude is very different from that of a group of first-grade children who, on being shown a very attractive but simply constructed doll house, responded with "Oh, I could make a chair like that! I could make a table like that!" a response which indicated a feeling of power and an expectation of success. Such a habit of mind tends to accomplish much more in this world than the opposing attitude of waiting for the authority of a leader before any step is taken.

To meet the conditions above outlined, nontechni-

cal or expressional handwork may be used in two ways. First, through illustrations of various sorts, an idea which has its source in the book subject is made clearer or more deeply impressed through the making of an illustration. *In illustrative work the current of thought flows from the book subject to the handwork.* Second, a

project, such as that of building a store or playhouse, may be undertaken for its own sake. The process of building will necessarily involve many phases of work commonly studied as separate subjects. The parts will have to be measured and number problems of a practical sort will



FIG. 5. — The Wooden Horse in the Siege of Troy. Third Grade Boy. St. Joseph, Mo.

demand solution. Color combinations and proportions will call into use all the worker's good taste, which is but another name for applied art. Interesting points will arouse curiosity and a desire for further knowledge which is to be found in books. The books will then be read with a real motive. Discussions will arise over many topics, causing each contestant to defend his position in the most force-

ful English he can employ, and he then has "something to say" instead of "having to say something." In this second type of expressional work, which for want of a better term we may call *representative*, the *current of thought flows from the handwork toward the subject matter* which develops incidentally but none the less vitally.

The early school years belong to the period in which, in the words of Dr. Dewey, a "child's world is fluid and fluent." He lives in a world of imagination in which the real and the unreal are so inextricably tied up together that he cannot make distinctions. The Three Bears may be as real to him as the members of his family. This would indicate that a large part of the handwork in the lower grades should consist in the working out of representative projects such as homes for storybook friends, and make-believes of all sorts. If these free representations are carried on extensively, situations begin to arise in which the pupils feel their lack of control over the tools and materials they use. They begin to wish they knew how to build a better house, or weave a better rug, or make prettier curtains. They are then ready for suggestions and instruction of a technical sort. Representative problems, therefore, form a very proper preparation for, and introduction to, technical handwork in various materials, in that they give to the pupil a first-hand experience with many materials and a few simple tools. This experi-

ence generally awakens a desire for further knowledge and skill, and supplies the motive for technical work. While work of this sort belongs chiefly to the lower grades, a housebuilding project is capable of such varied interpretation that it develops from a mere playhouse in the lower grades to a study in house decoration in the upper grades. This and similar problems are worthy of frequent repetition from a different viewpoint.

These representative problems, which may serve as a motive for many forms of traditional subject matter, might legitimately be treated in a discussion of illustrative handwork. Being especially suited to the work of the lower grades, detailed suggestions have already been offered in the author's book on *Primary Handwork*, and only such reference is made to them here as is necessary to establish the desired point of view. The outlines here offered are confined to illustrative problems which are based upon the traditional subjects as commonly found in courses of study. It is hoped that their use, which is growing in popular favor, will not only add interest and force to the traditional subjects as commonly taught, but will also make more evident certain glaring defects in our present methods and help to eradicate them. Among these latter might be mentioned the overcrowding of classes, the lack of activity, the inadequate equipment of many schools, and the retention of obsolete subject matter.

If the principles here outlined are accepted as a basis for organization, the relation between technical and expressional work might be represented by the accompanying diagram. The free work would receive the major emphasis in the beginning, gradually giving way to the desire for greater technical con-

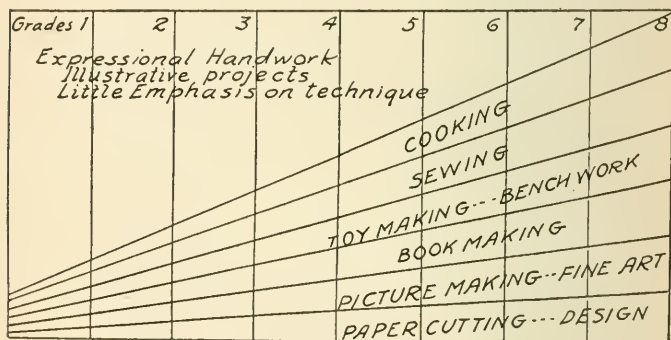


FIG. 6. — Development of Technical Handwork.

This diagram is intended to suggest the relatively large use of free expressional handwork in the lower grades as compared with the emphasis on technical handwork in the upper grades. As ability to visualize and to think abstractly develops, the need for illustrative projects decreases. At the same time a developing consciousness of definite needs demands increasing emphasis upon the various technical processes of handwork.

trol. The emphasis on technical processes would be very slight at first, gradually increasing with progress through the grades. This enlarging emphasis upon technical processes would naturally deal with definite phases of work; therefore, the technical wedge in the diagram must be divided longitudinally to indicate the various subjects which would arise out of the earlier use of expressional methods and a largely unified curriculum. The grouping of subjects

in the technical wedge is suggestive only, sufficient data upon which to base definite conclusions not being available.

Illustrative handwork has a place all through the grades, not only as a means of expression but also as a means of impression. Often a rough model, a quickly constructed sand table project or a striking poster will convey more at a glance and make a more lasting impression than can be gained from pages of reading or lengthy verbal descriptions. If this is true, it follows that graphic expression should be accepted as a regular form of study and recitation and be recognized as having a value comparable with talking and writing. While the field of technical handwork must always belong to the technically trained teacher, illustrative work, being but a method of teaching, is the province of the classroom teacher. While nontechnical work may be carried on with considerable success by any resourceful teacher, it is reasonable to expect better results from those who have been trained with this point of view. In time, such methods must become as much a part of the training of a classroom teacher as is training in methods of teaching arithmetic or music. Until such training is generally given, the untrained teacher is not likely to experience any more difficulty in the use of illustrative handwork than she now encounters in teaching music, art, physical culture, or any of the modern additions to the traditional curriculum.

Handwork in Relation to General Subject Matter.

—The question is frequently asked, "How much time should be given to handwork?" and in answer the accompanying diagram suggests the large use of free expression through games and plays as the proper introduction to school work. In the lower grades,

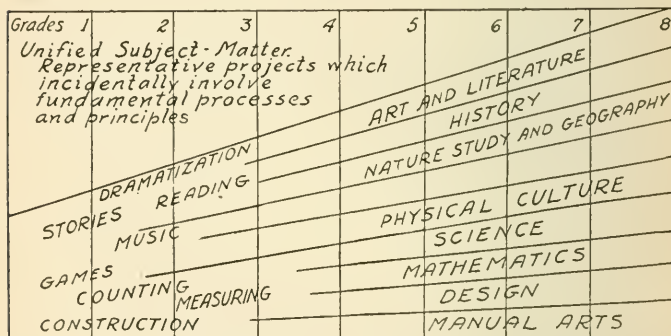


FIG. 7. — Proportionate Emphasis on Unified and Differentiated Subject Matter.

This diagram is intended to suggest the relative proportion of emphasis in the upper grades upon well defined subjects, as compared with the comprehensive projects of the lower grades out of which these subjects arise incidentally and develop naturally.

while the child's appreciation of differences is slight, a largely unified method of organization meets his needs and representative projects may be used almost exclusively. But very soon the desire to make better pictures, to read interesting stories, to write real letters, to measure with ease, creates a feeling of need for power to control these values and a consequent eagerness to be taught the tricks of the trade. Meeting these specific needs will gradually change the unity of primary work into the differen-

tiated curriculum of the upper grades with technical handwork as one of the subjects to be studied.

Illustrative handwork is in no way a substitute for technical work, though representative problems serve as a desirable introduction to, and motive for, technical processes. Illustrative handwork must be regarded chiefly as a method of teaching traditional subjects. The time to be devoted to it depends upon its value as a method. As the power of visualization and abstract thinking increases, the need for concrete illustration decreases; therefore, illustrative handwork though still helpful on occasion, may receive correspondingly less emphasis in the upper grades.

In many schools unable to afford equipment for technical work, no provision is made for handwork of any sort, the entire time being apportioned to the various traditional subjects. In such instances the use of illustrative methods offers a means of introducing some activity into the daily program and giving some acquaintance with handwork processes and materials without interfering with the time schedule. Used as a method of teaching geography, for example, the work may legitimately be done in the time allotted to that subject. In carrying out the experimental projects outlined below, especial attention was paid to the amount of time needed for illustrative work. A study of these projects will show that practically no extra time was required, because of the method used.

It may be confidently assumed, in view of these facts, that handwork and other activities may and should receive a much larger proportion of emphasis in the grades than we are accustomed to give them.

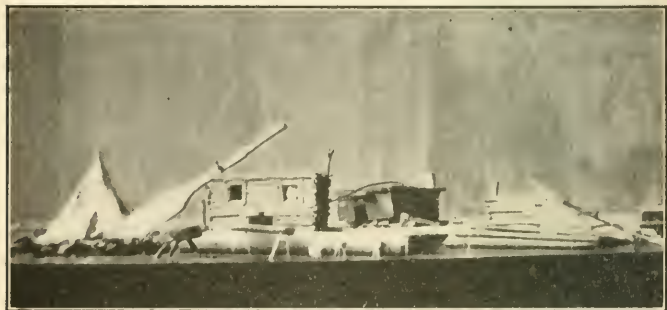


FIG. 8. — Early Days in St. Joseph, Mo. Fourth Grade.

If the physical and mental needs of the children in the lower grades were adequately met, then in the proportioning of work, as shown in the diagram, representative problems such as playhouses and playstores, together with illustrative methods including

dramatization as well as handwork, would occupy a very large proportion of time. This emphasis would gradually decrease, giving place to technical instruction in different phases of work as these become prominent in the child's mind and a feeling of need for them arises. Thus, the building of a playhouse will prepare for and lead to the study of numbers, language, and art, with their many subdivisions, and to a technical study of tool processes. The making of posters and booklets will prepare for and lead to the making of regularly bound, well written and illustrated books in the upper grades. And, further, the use of illustrative methods in the study of these subjects would serve as the connecting link between the unity and freedom of the early work and the more technical and differentiated courses of the middle and upper grades.

Illustrative Handwork and Expense. In view of the ever-present question of cost, this discussion would be incomplete without a word upon expense. The necessity for special equipment and tools which is incidental to the introduction of all forms of technical handwork, is almost absent in the introduction of illustrative handwork. In this instance, the pupil is expected to express his ideas to the best of his ability with the materials at hand. The value of his work depends quite as much upon *how* he uses what he has and can find to work with, as it does upon *what* he produces. Varying resources will

produce varying results, but purposeful effort is sure to develop resourcefulness and independence of thought and action, qualities highly desirable in our democratic civilization. The use of illustrative methods, though begun with little or no equipment, will generally lead to the discovery of ways and means for securing what is found essential, and in due time open the way for the establishment of technical courses in schools not having such work.

Free Expression and Classroom Discipline. — To many teachers, good order still means a quiet room in which the pupils never speak or leave their seats without permission, where military discipline maintains in the conduct of classes to and from recitations as well as in and out of the room. This method seemed to have reached its limit in the case of a rural teacher who tapped his bell and gave the commands, "Class in History, Turn, Rise, Pass, Halt, Dress the Line"; all of which one lone pupil did his best to obey. To many teachers, the idea of an unprejudiced democratic standard of equality is interpreted as *identity* rather than as *equality* of opportunity, and no exercise is acceptable which does not allow or require all members of the class to be engaged upon the same sort of work at the same moment. To teachers having such ideals, the suggestion of free expression is confused with the Bedlam-let-loose type of disorder they sometimes find in their rooms when restraints are removed, and it seems impossible

for them to conceive of a happy medium between the two extremes. The emphasis placed by the author upon the need of opportunity for self-expression, and the need of throwing pupils upon their own responsibility, is in no way intended to suggest that the teacher is to let the pupils do as they please and accept any sort of work because it was done independently.

It takes more teaching and better teachers to conduct work of the type outlined in this book than for the ordinary study and recitation method. It takes greater teaching ability to guide and lead a small group of children who are free to act upon their own impulses, even within limits, than it does to control a larger group by mechanical methods. It is believed, however, that freedom of method is possible even with large groups and that the results justify its wise use.

The difficulties in the way of changing from mechanical to free methods are chiefly in the mind of the teacher. She must first convince herself that more good is to come to the pupil through learning to guide his own actions wisely, than through unquestioned obedience to authority at all times. She must convince herself that a busy hum is not disorder in a schoolroom where work is being done, any more than it is disorder in a factory where machines are at work. But she must learn to distinguish between the busy hum of a smoothly running machine and the squeak of one that needs attention. The school as



FIG. 9. — Robinson Crusoe. Fifth Grade. Columbia, Mo.

a workshop is not always a quiet place, but many kinds of noise are like the squeaking of machinery and call for immediate attention from the masterworkman. The quiet schoolroom, on the other hand, may be sometimes akin to the quiet of the cemetery and produce no results.

Having once become convinced of the value and need of freedom in school methods, it is necessary to introduce changes wisely. Any sudden or wholesale revolution is apt to be disastrous to the best interest of all concerned. Sandtable work, for example, will be a distracting

influence when introduced unless it is managed wisely. One of two methods may be used, according to conditions. A few trusty pupils may be allowed to work out, quite independently, some attractive project. Rightly managed, this will inspire others to try to be worthy of a like privilege. The withdrawal of the privilege is generally adequate punishment for those who abuse it. In some schools, however, the children are so accustomed to leaning upon the teacher's planning, and the teacher is so accustomed to directing every minute detail, that neither would be comfortable if another ideal were suddenly imposed. In such a case, if the teacher will select a project with which her best pupils are more familiar concerning details than she is herself, it will be possible for them to plan together. The children will have real suggestions to offer and will begin to think and act independently. One teacher who tried this method was surprised to find her best work in the subjects so treated.

In the making of posters and booklets it will be hard for the teacher described above to accept some results of her pupils' efforts when they are not up to her own standard, even if the children have done their best. She will want to keep the pupil after class to do the work over, or will even add a few telling strokes of her own pencil to bring out the picture, to show the pupil how it should look. She will want to refuse to let a pupil use a crude color that to his

untrained eye is most beautiful, because it will spoil the effect of her exhibit. She will measure her success in terms of the booklets and posters which she calls the *results*, and will regard the imperfections of any of them more as a reflection upon her ability to teach than as an indication of lack of capacity on the part of the pupil. Having such a point of view, it is not surprising that she yields to the temptation to "touch up" the work of her pupils, particularly if it is to be inspected by those in authority or offered for comparison with the work of other teachers. When we become more concerned for the real development of the children than we are about praise for our apparent results, we will realize that our efforts are vain unless we can so teach that our pupils will appreciate and desire the better things. Anything less than this can never be real success.

Many teachers work upon the theory that if pupils are required to act in a certain way or to conform to certain standards until a habit is formed, they will come to appreciate and enjoy the process and use it willingly when restraint is removed. Probably every teacher who reads these words will be able to recall disappointing instances which will prove the weakness of such a theory. The story of the boy who, wishing to give his art teacher a present she would enjoy, chose "the ugliest picture they had" is a true story, not only in the original but in many similar instances in which the teacher rejoiced in

empty *results*. At best the successful operation of such a theory can produce but a superficial veneer in lieu of real culture and will only add to the lists of those who know the names of all the great artists, can tell the names and market value of the great masterpieces, yet who never feel a thrill over a sunset or notice a beautiful rose, and whose back yards are far from being gardens.

Many teachers who pride themselves upon their discipline and ability to *control* their pupils by sheer force of will, look askance upon the enthusiastic believer in free self-expression and feel sure that all such liberty is but license due to the teacher's lack of power. The words "must" and "ought" are so prominent in their vocabulary that they cannot imagine the school program moving cheerfully along by the force of compelling motives which are to be found in the work itself. When they find a class of genuinely happy and joyous children they imagine it is because the teacher is entertaining them instead of teaching them.

Normal, healthy children are brimful of joyous energy which will find its outlet somewhere. If it is suppressed by stern discipline which expresses itself in a long list of "don'ts," it will bubble out in pranks whenever restraint is removed. In such a school the casual visitor sees all sorts of fun going on when the teacher's back is turned. If such a teacher can persuade herself to adopt a new point of view, this

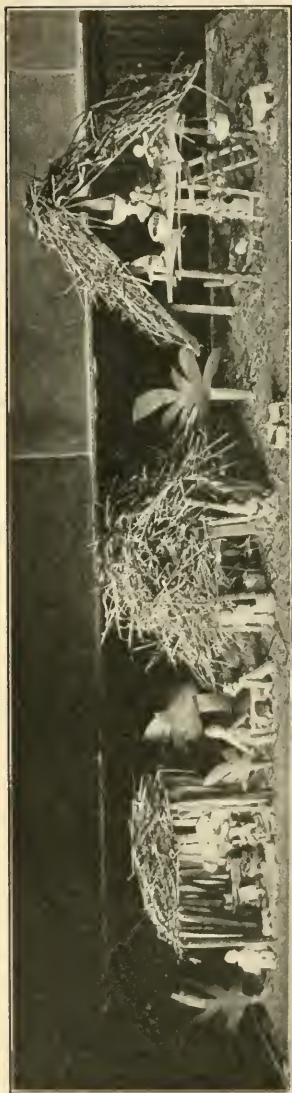


FIG. 10. — Primitive Homes in the Philippines. Fifth Grade. Columbia, Mo.

boundless energy of the children can be turned to profitable account in regular school work. If she can offer to them work which appeals to them as attractive and worth while, they will soon be so busily engaged upon it that discipline will take care of itself.

Criticism and Growth.

— If real growth is to be secured it must be based upon the child's independent efforts. The measure of his development must always be what he can do by himself. The success of his unaided efforts will depend to a large extent upon the ideal toward which he works. It is of vast importance, then, that right ideals be securely established. Appreciation is a matter of development, often very slowly accom-

plished and often hindered by the use of arbitrary standards of excellence. In many instances a child rejoices over a high grade, or weeps over a low one, without knowing wherein he has failed or succeeded.

Class criticism of class work offers an excellent means of developing right standards of appreciation. When any piece of work has been finished, the entire class should sit in judgment upon it. The wise teacher will be careful about expressing her own opinions, lest they be adopted by lazy-minded pupils who do not want to think for themselves, or by those who consciously or unconsciously wish to gain favor.



FIG. 11. — Cliff Dwellers — Primitive Homes.
Sixth Grade. Jefferson City, Mo.

In conducting class criticism the children should first point out the things they like. This will give the teacher a chance to study the quality of their appreciation and will indicate where she should place the emphasis in her teaching. It will also forestall any tendency to laugh at mistakes or to say spiteful things. Their attention may then be directed to some one or two prominent defects and

possible means of improvement. In the next attempt they should look to see if these defects are less marked than in the first effort. One by one the various elements which make for success should be brought into the focus of attention and studied until the children know how those elements should be treated. Such a course will bring about a marked improvement in the quality of work and an intelligent appreciation of the means of success.

It is a serious mistake to attempt to correct many errors or all the mistakes in one piece of work. Many teachers burn midnight oil blue-penciling every misplaced capital, period, and comma in composition work, and all the pupil sees when the paper is returned is that he has passed or has failed. When he is required to do the work over, his mind is apt to be a jumble of vague ideas through attempting too much, and his next effort shows little improvement.

The development of appreciation cannot be hurried, and the teacher must be willing to make haste slowly. It is a question of individual likes and dislikes. The liking for the crude thing may be deepened by being forced to yield to what the teacher likes. The wise teacher will study these likes and dislikes of her pupils and try to lift their taste to a higher level by making the better things more attractive, irresistibly attractive. She will measure her real progress by the standard of what

her pupils like and want to do when left to themselves.

How shall we grade our success in picture study if we measure ourselves by the power of the "funny page" in the newspaper? How shall we grade our teaching of literature when the masterpieces studied in school are thrown aside for the cheap novel? How shall we grade the results of our discipline when our pupils transfer their allegiance to our authority in school to that of the ward boss in politics?

"There can be no teaching where there is no learning," says Dr. Dewey, "any more than there can be buying without selling." If education is that which *changes us*, we must be able to point to real changes in our pupils or admit that in all our efforts we have not *taught*.



FIG. 12. — Tree Dwellers — Primitive Homes.
Jefferson City, Mo.

Some of our educational practices have been based upon a theory that education is the acquisition of knowledge. We have assumed that the child's mind is a clean, blank paper, whereon we may write what we will. Or, to change the figure, in classroom practice we seem to have assumed that the child's mind is an empty cupboard full of many small compartments and that the teacher's business is to supply him with numerous facts which he is to store away, all properly labeled for use. We have bidden him store away the fact that seven times seven equals forty-nine with great care against the future time when a need for it will arise. We have drilled and drilled to be sure these facts were all properly labeled and in the right pigeonhole. But alas, facts fall out of memory as do papers out of pigeonholes and sometimes in returning them the labels are lost or we put them back in the wrong place. And so it comes about that "seven times seven equals forty-nine," gets mixed up with "six times eight equals forty-eight," and trouble follows.

This conception of the child mind, useful and truthful as it may be within limitations, fails to take into account the lively, dynamic nature of children. Another and better conception is that which likens the child to a growing plant and the school to a child-garden, in Froebel's beautiful ideal. With such a point of view the teacher, while not unmindful of the importance of facts, is still more deeply concerned

with the growth of the child, a process which develops from within outward, and not by external additions. She watches and tends each bud of promise that it may come to full bloom. She strives to supply the best conditions to stimulate a natural growth. She protects from harmful influences and sometimes uses the pruning shears.

Instead of playing the pompous rôle of dispenser of facts, inspiring awe that one small head can carry all she knows, she works in the humble rôle of gardener. She does her part with wisdom and care, but knows the growth must come from within and that she must wait with patience for the often slow processes of nature to bring her work to perfection.

She realizes that all the plants in her garden are not of like variety nor of equal strength; therefore, she watches the development of each with individual interest and personal care, in the hope that she may develop the best in each one to its fullest value.

CHAPTER II

VARIOUS FORMS OF ILLUSTRATION

FOUR general types of illustration are included in the suggestions outlined in the following pages: posters, illustrated booklets, sandtable representations, and illustrative constructions, including models and miniatures.

POSTERS

The term "poster" as here used implies any picture which attempts to bring out in a graphic way some particular idea. They may well be called "descriptions without words." As the advertiser strives to catch the eye of the passer-by and impress an idea at a glance, so the pupil attempts through the poster to express his idea so clearly that "he who runs may read." Such pictures may be the individual productions of the various members of a class or they may be the combined efforts of a group. They may be made in several ways. They may be freehand sketches, either drawn or painted. They may be made up from freehand cuttings and take the form of a silhouette. They may be collections of pictures cut from old papers and magazines and



FIG. 13. — Crayon Sketches for the Sleeping Beauty. First Grade.
Columbia, Mo.

mounted on a suitable background. In every instance the essential feature is that the maker shall be endeavoring to express an idea clearly. The



Courtesy of Normal Instructor.

FIG. 14.—Story Illustration in Brushwork. Second Grade. Columbia, Mo.

educative value of poster making is directly proportionate to the emphasis placed upon this essential. This implies first of all that the pupil must have a definite idea to express. The clearer the idea at the start the more successful the expression is likely to be. It is true, however, as stated above, that the

attempt to express in tangible form does tend to define and clarify an idea which may be somewhat vague at first. The making of the poster offers an opportunity for the teacher to judge the quality of the child's mental operations as evidenced in the vagueness or clearness of his expression. This implies also that in the making of the poster the pupil must be allowed to express his own ideas freely. He should be thrown upon his own responsibility to the fullest possible extent in the choice of material and in its arrangement. The teacher who in her zeal for showy results directs too closely in these matters, robs the children of the development which comes through the necessity of deciding for themselves.

A striking example of the truth of the above statements occurred in one classroom. The pupils were being introduced to the process of poster making and were working with great earnestness. Their immediate problem was to show the products of a certain country by means of pictures collected from various sources. No directions had been given except that they were to find appropriate pictures and arrange them as tastefully as they could upon the mounting sheet. As the posters were finished they were put up in the display panel above the blackboard for the benefit of the class. One little girl had been very zealous and had succeeded in finding a large number of pictures. She put her

chief treasure, a colored (pink) picture, in the middle of her poster and grouped all the others closely about it. Before it was finished several other posters were displayed on the wall, giving her opportunity for comparison. When her own was finished she handed it to her teacher with the comment, "Mine isn't any good. It's too crowded." Perhaps it "wasn't any good" for use in a collection for a school exhibit, but it had at least been good for the purpose of opening one child's eyes to an appreciation of certain art values. Perhaps some reader is skeptical and thinks the teacher should not have permitted the child to produce so poor a piece of work, but should have offered helpful suggestions in time to secure a better result. Let us see. Suppose the teacher had directed the children to arrange their pictures but not to paste them until her approval was given. Undoubtedly, she would in this case have called attention to the overcrowded arrangement and the child would have felt that her large collection of pictures was not fully appreciated. The teacher would also have been quite likely to advise the removal of the pink picture, the most beautiful one in the child's eyes. The teacher's advice, or command, would have brought about a better poster, but what else? A disappointed, perhaps sullen child would have been yearning for the picture she had meant to make, while feeling herself unappreciated and thinking little of her teacher's taste. In



FIG. 15. — Cuban Industries. Paper Cutting. Second Grade. Columbia, Mo.

the other instance, which is happily the real one, the child carried out her own idea, found it unsatisfactory, and was in a teachable frame of mind. Having already risen to a higher level of appreciation in the discovery that her work was "too crowded," she was eager to receive suggestions for its further improvement.

In our haste for *results* we are apt to overlook the real purpose of our work and forget that true education is, as Dr. Thorndike expresses it, that which *changes us*, and that the external results are valuable chiefly as a proof of the inward transformation. Too often we cannot, or will not, take time to let the child find himself through his own activities, but must cover the prescribed amount of ground in the given time and get *results* that look well on the classroom wall. ✓

Poster making and all forms of illustrative work should be treated as seriously as the arithmetic lesson or any other regular exercise. It should not be used as recreation merely, nor only for display purposes on visitors' day. If it is used as regular work, there will always be plenty of material for display when needed.

Materials. — Pictures of a helpful sort are scattered through daily papers, discarded magazines, and much advertising matter, where their value is lost. These may be collected, mounted, and preserved for general and individual use. Freehand

sketches with pencil, crayon, or water color may be made on drawing paper of various grades. Free-hand cuttings may be mounted on bogus or kraft wrapping paper. These two papers are cheap and easily obtainable and serve well as mounts and backgrounds for all sorts of posters. Ingrain wall papers serve well as mounts for large posters.

Subject Matter. — Subject matter for posters may be drawn from the various subjects studied, particularly history, geography, and literature. In history the poster may emphasize some particular event or a series of events; such a series as the early explorations in America may be brought out in a series of posters (See Project No. V).

In literature the emotional appeal is deepened through the attempt to portray even roughly the situations described. In the illustrations for Miles Standish shown on page 174 the pupil had to imagine himself in John Alden's place before he could give Alden the dejected attitude suitable to his state of mind while on the way to do his friend's bidding. The freehand sketch is especially suitable in the study of literary topics dealing with character.

In nature study, pictures of plants and animals may be collected and grouped under significant heads, such as useful plants and the purposes they serve, harmful insects and how to get rid of them, domestic animals and how to care for them.

In geography, the topics of scenery, occupations,



FIG. 16. — Posters from Fourth and Fifth Grades. Columbia, Mo.

productions, homes, costumes, and many other topics, may be studied through the making of posters. A single poster may be made to show the products of a region, or a series of posters may trace the source, manufacture, and distribution of a single commodity. For example, a series of posters on iron would show a chart map locating the principal iron deposits, the methods of mining and manufacture, the variety of things made from iron, and the commercial features connected with the distribution of iron products. The making of such a series of poster illustrations becomes, or may become, a method of study in so far as the workers are thrown on their own responsibility in collecting materials. The results may be treated as a form of recitation in so far as they give evidence of what the worker has learned concerning the subject in hand.

Class Organization. — Poster making permits a wide variety of class organization. Each pupil may make an individual illustration for a single topic. This gives opportunity for comparison and shows differences in conception. The slow pupil gets ideas from his brighter mates. Secondly, a large topic may be subdivided, giving a different feature to each pupil, allowing opportunity for covering a broad field quickly and giving the entire class the benefit of more than any one member could accomplish alone. Or, each member of a group may contribute a part to a single illustration, calling into



Fig. 17. — History Posters from Seventh Grade. Columbia, Mo.

action a community spirit. The main features of a subject may be shown in a single poster, or related events may be shown in a series of pictures. Such a series may be the work of one pupil or of a co-operating group.

Standards and Criticism. — In the making of posters first emphasis should be laid upon illustrative value. The picture should tell its story clearly and well. Emphasis should also be laid upon the art values of spacing and color harmony. Spacing is especially important in the mounting of pictures. A good poster should need very little explanation, but such as is given should be printed in plain, well-made letters. Few school children are able to print well. Poster making tends to make them appreciate the value and importance of good printing and to stimulate them to become proficient. Art appreciation being a matter of growth should receive due attention at every point, that the children may absorb the idea that beauty in life concerns our everyday affairs and consists largely of executing small details in a beautiful and finished way.

Finished posters should be criticized in a kindly spirit by both pupils and teachers, and suggestions offered for the improvement of the next set. The method of criticism should always look for and emphasize the good points first. This alone will cause the quality of the work to rise to a higher level. After the children learn how to find the good points

and give a reason for liking them instead of laughing at the mistakes of their classmates, it is helpful to use a constructive form of criticism, as for example, "John Alden is larger than the trees in the forest"; "The letters in the title are irregular"; "The border line is too heavy"; and similar comments.



FIG. 18. — Hallowe'en Posters. Fifth Grade. Columbia, Mo.

In general this method of criticism holds good for all forms of handwork. The teacher's opinion, arbitrarily given, does little to help the children to higher independent judgments. They need to be taught, little by little, what points to look for and what makes them right or wrong. Unless we can

develop in them intelligent standards of appreciation, art education will fail of its purpose and we shall encourage a superficial juggling with high-sounding terms and a servile dependence upon any popular authority. Continued through the grades as a method of illustration for general subject matter, poster making offers a field in which the pupil may apply the technical points studied in his drawing lesson. The drawing hour may often be devoted to teaching how to get better results in some particulars in which the work is weak.

Suggested Applications.

1. Illustrations to emphasize any point in daily lessons which can be more effectively impressed by the making of a poster.

2. In general reviews much ground can be covered quickly and effectively through a poster contest. (See Project No. V.)

3. Much helpful reference matter may be collected from current papers, mounted on uniform cards, and filed in an indexed box for future use. This helps to develop systematic habits and encourages a public-spirited thoughtfulness for the general welfare.

Points to Be Especially Emphasized.

1. *Choice of material.* — Does the poster tell its story clearly? Avoid attempting to tell too much.

2. *Arrangement.* — If several small pictures are used, do they make a well-balanced page? This is

an excellent field for applied design. Avoid crowding.

3. *Drawing and color.* — Poster making offers a field for developing ability in freehand drawing and in color harmony.

4. *Lettering.* — A very important factor. Poster making creates a feeling of need for ability to letter well and stimulates progress. Encourage plain lettering, well executed.

5. *Margins.* — A well-proportioned margin adds much to general appearance.

BOOKMAKING

Illustrated booklets as a form of school work are in common use and form a helpful accompaniment to nearly all book subjects. The interest aroused through collecting and sketching illustrations for the booklet has great motive power. Binding the sheets into appropriate and attractive covers gives a stimulating sense of permanent value to written work. Too much classroom work finds early lodgment in the waste basket. Only the buoyant hopefulness of youth can persist in long continued and repeated efforts at writing, done only to be thrown away as soon as its mistakes have been pointed out. The opportunities in bookmaking for incidental emphasis on art values are similar to those noted above under the head of poster making.

The successful results to be derived from the

varied opportunities offered, depend largely upon the methods used. In many schools booklets are made only for exhibit days and special occasions. The importance of these occasions demands an outward show of success which is often attained through strained supervision, wearisome alike to pupil and teacher.

In such cases the teacher assumes responsibility for the final result by selecting and outlining the subject matter, criticizing the first draft, and requiring it to be rewritten until it reaches or approaches a given standard. She usually dictates the



FIG. 19. — Booklets. Sixth Grade. (See Project No. IV.)

cover design by the same detailed process. The pupil struggles to express the ideas the teacher has apportioned to him, often with much unwillingness. By the time the final result is reached, all the joy it might have held has vanished, and the work is neither a self-expression for the pupil nor often a satisfactory example of the standards set by the teacher.

The making of a booklet reaches its highest educative value when the pupil feels the maximum responsibility for its success. He should feel that he has something to say which is worth saying, some information to record which is worth preserving. He should be inspired to make his record as accurate as possible and to preserve it in appropriate and attractive form. The work should be treated as a phase of common study and recitation and not as a means of display. The best results, described later, were secured when the pupil was required, before his work was inspected by the teacher, to write his descriptions, select and arrange his illustrations, and then fasten his material in an attractive cover. In so doing, he felt the same necessity for *knowing* that his statements were true that an adult feels when writing an important letter. The mistakes found in the finished production were of more serious moment than when there was opportunity to correct them. As a rule it hurts more to be refused the privilege of correcting an error one wishes to blot out than to be forced to correct a mistake one does not regard as important. (See Project No. XII.)

Materials. — The use of separate sheets of paper of a fair quality and uniform size has many advantages over the use of composition books. If corrections are needed, a leaf or two may easily be replaced without spoiling the general effect. The various cover papers, bogus paper, certain plain wall papers,

and heavy kraft wrapping paper all serve well for covers. Stiff boards with cloth backs may be used by advanced classes. Macreme cord or any heavy cord may be used for tying leaves and cover together. Paper fasteners serve for temporary work but are more expensive and less attractive than the cords. Crayon, water color, and India ink may be used in making cover designs. (See Project No. XII.)

Pictures for illustration other than freehand sketches, may be found in many waste papers and discarded magazines. Very excellent pictures are often to be found in advertising material. In one town the children made such a thorough canvass for material of this sort that a business man said he never threw any paper into his waste basket without looking to see if it had on it any poster pictures that the children might want.

Subject Matter. — Subject matter for illustrated booklets may be drawn from nearly every field of study. Beginning in the lowest grades the book may be only a collection of leaves upon which are mounted free cuttings or crayon sketches. Later, as the children learn to write, names and brief descriptions may be added. As progress through the grades is made, the text becomes more and more prominent until in the upper grades it is possible to produce well-bound books, carefully written or typewritten, and sometimes printed by the pupils.

Class Organization. — Booklet making is of necessity an individual process, except in the few instances where it is desired to have each pupil contribute something to a composite production which is to be retained by the school. The variations possible lie in the organization of the work for the individual pupil. His efforts may be directed toward a few large projects for which material is collected during a long period, or each phase of a subject may be treated by itself. These points must depend upon the nature of the subject.

Standards and Criticism. — The points already enumerated under the head of posters apply with equal force in the criticism of illustrated booklets. The standards by which the work of any grade is judged should never be so far beyond the development of the pupils that it is impossible for them to attain fair success through their unaided efforts. Bookmaking should begin in the lowest grade, where it need be only the fastening together of a few leaves on which pictures have been made or cuttings mounted, and should continue through the grades with steady progress in form and technique until in the upper grades well-bound books are produced.

While bookmaking serves as an adjunct to various regular subjects, adding interest to the study and providing a desirable method of preserving useful information, the various processes involved in bookmaking are worthy of study as a technical subject

which may be organized in a series of progressive exercises well suited to the developing capacities of the children. In many schools a booklet is never more than a few sheets of written work tied into an over-decorated cover with a quantity of ribbon, this style being used in upper and lower grades alike. At least one advanced step in the process should be introduced each year, and the children should be allowed and required to use the method repeatedly until they master it thoroughly.

SANDTABLE REPRESENTATIONS

Sargent very aptly describes sandtable representations as pictures in three dimensions. As the ordinary picture adds vividness to the printed description, so the placing of actual figures adds reality to the scenes represented. The necessity for creating some tangible representation himself, helps the child to visualize the descriptions he reads and stimulates his imagination, since he must see with "his mind's eye" before he can successfully represent. This is a desirable habit of mind and worth cultivating, since it is an element of success in many fields of endeavor.

Work of this sort is at its best when the pupils are allowed to represent freely their conception of the topic. The attempt to express helps to give shape to otherwise vague ideas. The quality of the work done helps the teacher to measure the

pupil's power to grasp new ideas. Sandtables have been regarded as suitable only for primary rooms, to be used there for play rather than for serious effort. All through the grades, however, the sandtable picture furnishes a valuable medium of expression in geography, history, and literature, not

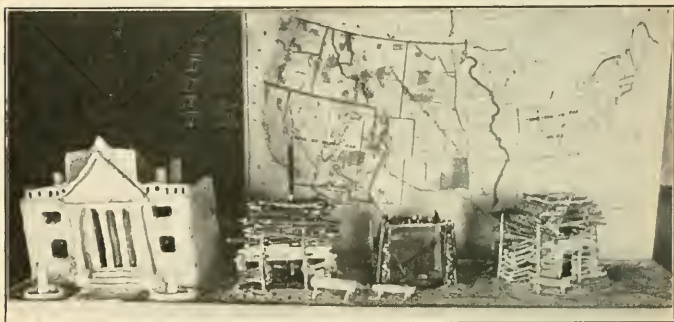


FIG. 20. — From Cabin to White House. Fifth Grade Class while reading the life of Lincoln.

(The work had been completed some days and was about to be torn down when the picture was taken.)

only adding interest to the study but making impressions more lasting through the graphic nature of the work.

Sandtable problems may be of two sorts, either elaborately planned miniatures which demand accuracy of detail, or quickly made representations which emphasize a few important points for brief discussion. Accurately made miniatures are often of great help in explaining perplexing details, but their construction requires too much

time to permit them to be used to any great extent in regular school work. Illustrations of the second type depend for their value upon general effect. They may be of very temporary construction, sometimes being made in a few minutes and destroyed as soon as they have served their purpose. Work of this sort is easily correlated with various phases of subject matter, particularly in history, geography, and literature, and it may be used as a regular feature of instruction without extravagant use of time and with great gain in interest.

Materials. — The materials suitable for sandtable work are as varied as the problems which lend them-



FIG. 21. — Two views of a Norman Castle.
Grade 6B. Franklin, Indiana.

selves to illustrations of this sort. Real materials add somewhat to the realistic appearance of such illustrations when they are to be had in convenient size. Since the work is representative in character, the use of representative materials is also possible. Paper may be made to do duty for wood, stone, and for forms of animal life. Clay may be used for many of these purposes. As a rule, the real material or its nearest substitute gives the best effect, but the value of the illustration is not dependent upon the accuracy with which the details are carried out.

Subject Matter. — Topics dealing with persons and places lend themselves most satisfactorily to sandtable work. Abstract and complicated problems are to be avoided. Very familiar topics which need no explanation or illustration are often best for the first attempts at illustrative work, as one important element in expressional work is the necessity for an idea to express. Beginning with some familiar topic upon which his ideas are clear, the pupil is better able to judge of his own success. Also, it is important always to begin with easy things in order to establish a habit of success and confidence rather than one of failure and discouragement. Such projects as representations of home life in various parts of the world, historic events such as the Lewis and Clark Expedition, geographic problems which concern the physical features of

the land, and scenes from literary studies such as the Legend of Sleepy Hollow, are all well adapted to sandtable illustration.

Class Organization.

—In some quarters the graded-school idea has been so greatly overemphasized that no topic seems properly presented unless every member of the class is doing the same thing at the same time. Since, however, only a few pupils can work advantageously about a sandtable, the class, unless it is small, cannot work as a unit on sandtable problems. Except in projects which require many small features which can be made by pupils in their seats, the work is best carried

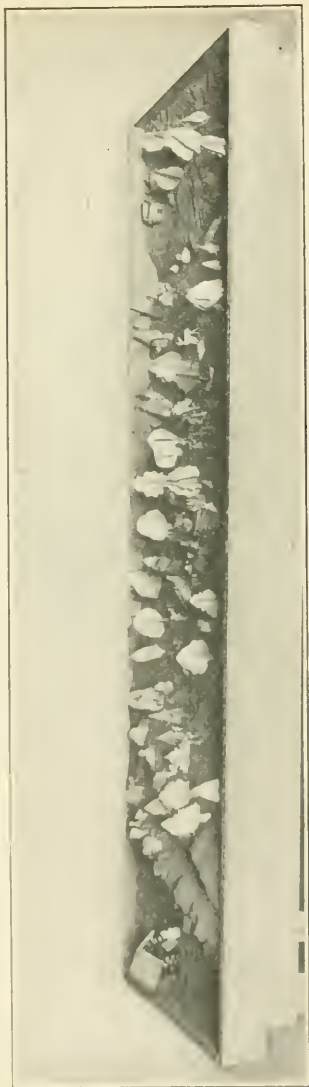


FIG. 22. — Story of Daniel Boone. Fifth Grade. Columbia, Mo.

Illustration showed better type of home in Virginia, stockade in Kentucky, Boone's Mansion in Missouri.

on by groups. Such groups may be organized with special reference to the immediate project in hand, or the groups may be definite companies which work in turn. The latter plan has the advantage of keeping enthusiasm keen, each company usually being anxious to get possession of the table and to put on its next project.



FIG. 23. — Booklets on Geography. Seventh Grade. Columbia, Mo.

A class of forty was divided into eight teams of five each. The members of each team co-operated in collecting and preparing the material for one booklet as regular class work.

The least desirable form of organization is that in which the teacher plans the project with great definiteness and dictates and supervises the particular contribution of each child. Methods of this sort relieve the pupil of the necessity of thinking for himself. The most helpful sandtable projects are those

made quickly to illustrate some topic under immediate discussion. It is also helpful to treat the work as a form of recitation and allow a group of pupils to model a contour map, for example, while the rest of the class work upon some other phase of the subject, such as posters showing costumes, homes, or products of the same country.

Many teachers fear to attempt sandtable work lest the novelty prove distracting and disturb the discipline of the room. If a few trusty pupils are allowed to build interesting pictures on the table, others will wish to be worthy of the same privilege and the work may be used as a spur to better behavior. The first project or two will, no doubt, be watched with intense interest by those at their seats, but this fact offers no argument against the work, and the wise teacher will turn the interest to account as a lever of control. The novelty will soon wear off, and after that, work at the sandtable will be no more disturbing than work at the blackboard.

Standards and Criticism. — In sandtable work the chief emphasis should be placed upon effect. In some problems this may demand considerable attention to detail, but quite as often the desired effect may be gained through a very temporary structure, quite crudely put together. Children should be led to appreciate the difference between the temporary structure and the crudity of careless

work. In an elaborate structure, planned to be made by the children under supervision, there is more danger of careless work than in the project in which they are allowed to work out their own ideas



FIG. 24. — Studies of Birds. Sixth Grade Class. Columbia, Mo.

These illustrations were memory sketches in water color after the bird and its habits had been thoroughly studied. Each pupil wrote upon seven or eight birds. Each description included a selected quotation.

to the best of their ability. The results of such work may be crude, but they seldom indicate carelessness. Poor work in an elaborately planned project may come from the pupil's failure to grasp what is expected of him, causing him to work blindly. When the responsibility rests upon the pupil, though his ideas may be crude, he knows what he is

trying to do and to that extent works intelligently. If the problem is well chosen, interest in it creates a desire for success.

Much emphasis should be placed upon speed in all sandtable projects, that the attention of the workers may be held to the main points to be illustrated, and

may not become so engrossed in minor details that they lose sight of the main issue.

As each project is finished it should be criticized by pupils and teacher, and after favorable comment upon its strong points, suggestions should be offered for the improvement of certain features likely to be met again. As a rule more will be gained by several projects involving similar features following each other closely, than in strained efforts to bring one project to a high degree of excellence, though the temper of the class must be considered in deciding such questions. (See Project No. XVII.)

ILLUSTRATIVE CONSTRUCTION

Closely related to picture making by posters and on the sandtable, is the construction of miniatures and models of interesting objects and mechanisms, such as the cotton gin, the water wheel, the bucket conveyer, etc. Reading descriptions of these things and looking at pictures of them is interesting and enlightening. The knowledge so gained may be clear and definite in some cases, but is apt often to be vague and soon forgotten. The attempt to make a model of the thing described sends the pupil back to the description to read again and again until he has a clearer mental picture. The attempt to "make it work" emphasizes many mechanical principles, and makes the idea still clearer, even though the work may be very roughly and crudely

done. Such attempts usually clear up the maker's idea to such an extent that he can point out the deficiencies in his own work and show how it should be made were he possessed of the proper materials and tools, or of sufficient skill, or of time in which to repeat his effort. It needs no argument to prove

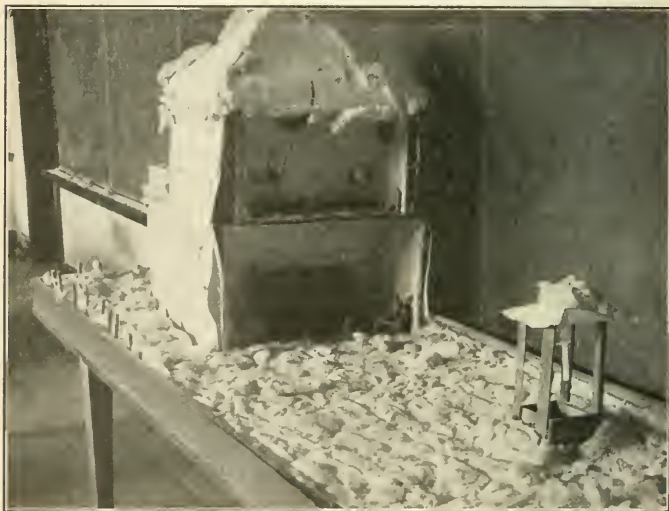


FIG. 25. — Snowbound. Sixth Grade Class. Columbia, Mo.

that a crude attempt coupled with such a state of mind has some advantages not to be found in a *model* which is a mere copy of another person's work made under dictation and without independent thought, even though such model were finished with great precision.

It is necessary to draw a sharp distinction between

construction of this sort and the usual work of the school shop in which the mastery of technical processes is the purpose. Whatever knowledge the worker may have of technical processes will add greatly to the success of his representation, and it is highly desirable that, as far as possible, such tools as he has should be used in a right way. He should not knowingly be permitted to drive screws with a chisel nor be allowed to form habits which will have to be broken later, but the reference to tool processes may be incidental to the larger purpose. In schools where instruction in shop methods is given, the construction of miniatures and models for illustrative purposes gives excellent opportunity for testing the extent to which a pupil can use his technical knowledge independently in a project which he plans and executes on his own responsibility. In schools where technical instruction is not given, illustrative construction gives opportunity for experimenting with tools and materials and gaining much first-hand knowledge at the time when the tinkering tendencies are strong in most boys.

Some schools do no handwork at all, arguing that it is better to do nothing than to do the wrong thing, but the constructive instincts are too important to be overlooked as factors in the educative process. While it is a serious mistake to pretend to be teaching technical processes as such unless they are rightly taught, much value comes from experimenting with

materials in a way which gives the worker first-hand acquaintance with their characteristics and makes him feel his lack of control over them. The harm comes, not through his crude effort, which he recognizes as crude, but through the formation of bad habits which he has been taught or allowed to be-



FIG. 26. — Zinc Mine. Summer Training Class. Missouri University.

lieve are correct professional methods of procedure. Free experimentation with materials under proper encouragement generally makes the worker conscious of his lack of control of both tools and materials. He is then in a teachable frame of mind, eager for the help of a master, and willing, when opportunity offers, to perform the drill work necessary to acquire skill in any process.

Some construction is usually required with any sandtable project, but many illustrative constructions may be made without reference to the sandtable. Models of machines and tools, representations of different types of houses and styles of dress may be included. Opportunity for proper correlation of this sort of work comes only occasionally, and it may often be done out of school hours and offered as a special contribution to the class by the maker. Once or twice a year some large problem, such as the evolution of travel, described later, may be taken up with advantage by an entire class.

Materials. — Any material which will serve the purpose may be used in illustrative construction, since little emphasis is placed upon technique. Wood, clay, and cardboard serve a variety of purposes. A few of the most necessary materials, such as wood scraps, cardboard, paper, cloth, and nails, with hammer and saw, may be kept always on hand in the classroom. For some projects a small amount of some particular material may be needed, which the worker will take pleasure in providing for himself. One boy, for example, whose part in the making of a Dutch farm was to provide the windmill, bought a mechanical toy in order to secure the spring which was needed to make his windmill turn.

Subject Matter. — The topics which may be helpfully illustrated by construction belong chiefly to the field of industry. Machines and tools, their

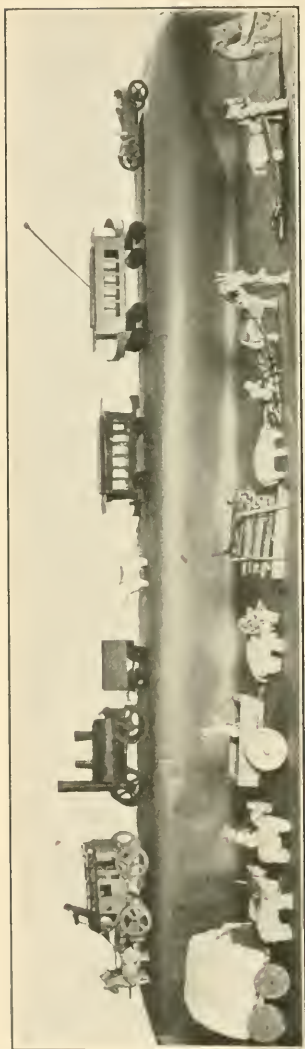


FIG. 27. — Evolution of Travel by Land. Training Class. Missouri University.

evolution and operation, costumes, utensils, and vehicles of different peoples, and similar topics, are full of interest and may, with advantage, be constructed with considerable care, to be passed on to future generations of pupils, each class adding something to the collection. The attempt to work out such constructions sets the maker to studying the secrets of their mechanism. Even though his project may not be highly successful, he is bound to gain some first-hand experience with physical laws and mechanical principles which helps in developing what we sometimes call "mechanical intelligence." That this quality of mind seems to be more common in

boys than in girls is probably due in large measure to the fact that boys have greater opportunity for and receive more encouragement in this sort of tinkering. Home-made apparatus for school use may also be included in this list of things to make. (See Project No. X.)

Class Organization. — Projects in construction permit a great variety of class organization. In large undertakings, the representation of the Panama Canal on the sandtable, for example, the work will require coöperative efforts under the direction of a leader or foreman. Many problems will need to be studied out together by the children, and since it is impossible for many children to work about the sandtable at the same time, the work must be divided among groups, each group responsible for a definite part of a common plan. Not least among the advantages to be derived from work of this sort is the opportunity it gives for organization and team work among the pupils.

In problems such as representing characteristic modes of travel in different countries, or the dressing of dolls in characteristic costumes, the different phases of the work are quite distinct and may be individual projects. Work of this sort may often be done at home.

Standards and Criticism. — In constructions, as in sandtable problems, the emphasis should be upon effect and illustrative value. Technique is, in

general, of secondary importance, but should receive more emphasis in models of a somewhat permanent character than is necessary in sandtable projects which serve their purpose almost by the time they are finished. Such a project as the model of a cotton gin, which is to be examined by many people, should be made well enough to bear inspection. In all free work of this sort a sharp distinction should be drawn between the crudity of work in which the maker has carefully done his best to express an idea and the crudity which comes from the careless worker who thinks anything is *good enough* if he can get it accepted.

The Study of Industries. — The common industries of the present day offer another rich field of study in which the making of miniatures and models adds vitality to the work. Such informal study gives a general acquaintance with various kinds of work which are being done in the world. Such knowledge is the first step toward vocational guidance. Problems of this sort are well suited to grades five, six, and seven, and form a helpful adjunct to the school excursion. If some sort of representation is attempted before the excursion is made, it increases the keenness of the interest and observation of the pupils, particularly in details with which they have had trouble. If the excursion is made first, the attempt to give concrete expression to the ideas gained impresses them more deeply and often sends



FIG. 28. — Studies in Industrial Evolution. Seventh Grade. Columbia, Mo.

them back to observe again to clear up vague impressions. The representation may sometimes be a model of some one machine or feature of a process. Again it may show the entire plant in miniature and the relationship of the various machines and processes. The lack of emphasis on technique allows free play for initiative and the children are apt to produce more ingenious models than any one teacher could suggest. Incidentally much information which is helpful later on when technical work is begun, is gained from handling tools and material. Topics such as the following will awaken keen interest in the middle grades and offer profitable problems in construction.

Any local industry.

A flour mill.

A planing mill.

An ice plant.

Brick-making processes and products.

A telephone system.

United States mail service.

Bridges of various types and uses.

Canal locks.

Elevators.

Electrical apparatus.

Motors of various sorts.

CHAPTER III

THE SELECTION OF TOPICS FOR CONCRETE ILLUSTRATION

(a) **Topics Not Suited to Concrete Illustration.** —

The field of concrete illustration is limited by the nature of the topics studied. Such illustrations are not equally valuable for all topics. Topics which cannot be adequately represented without complex details are not desirable for concrete illustration because the attention of the worker is apt to become so entangled in the details that he loses sight of the main issue. The thing he produces is apt to be so incomplete that it gives a wrong impression. Such topics also require an amount of time disproportionate to their value. For example, in illustrating the evolution of navigation, though models of simple types of boats can be made well enough to give a good idea of their character, children could not, even at considerable expense of time, make a model of a modern steamship which would show more than its general proportions. Good pictures would, therefore, convey a much clearer idea of the details of such a structure.

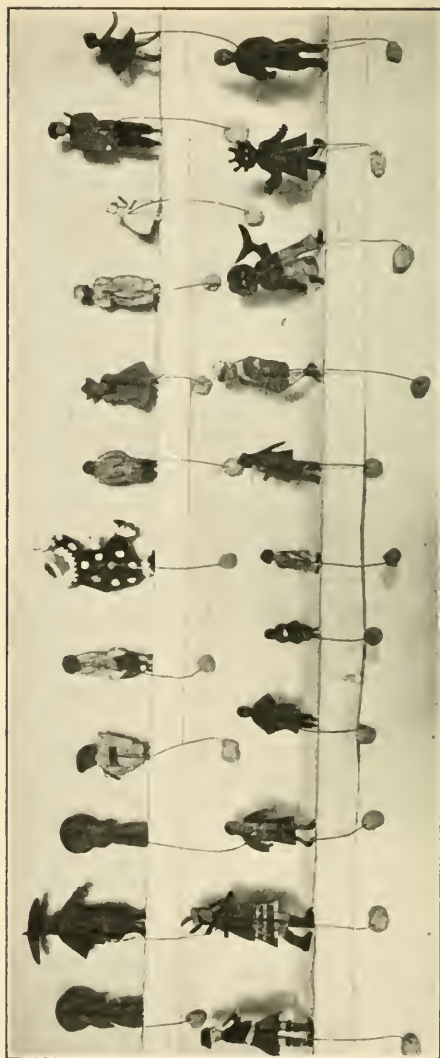


FIG. 29. — People of All Nations. Balancing Figures in Copping Saw Work.

Topics in which the chief values hinge upon questions of policy, time, speed, or other intangible or abstract ideas, are not apt to be greatly aided by concrete illustrations. Thus, for example, in studying the causes of the Revolution, since the subject matter deals chiefly with differences of opinion between England and the Colonies, it does not furnish topics which lend themselves to concrete illustration.

Topics which involve places and processes with which the workers are very familiar and which form an actual part of their daily lives do not need illustration. The actual making of a small amount of butter, for instance, might be very enlightening to a group of city children, but it would be a waste of time for a rural group well versed in the actual methods.

As a partial exception to this last rule, first attempts at illustration should deal only with topics with which the children are comparatively familiar, since free expression implies an idea to be expressed. This exception applies with special force when illustrative methods are first introduced into intermediate grades where children are old enough to be self-conscious and shy about expressing themselves. In such instances the familiar topic will seem easy and give them confidence in themselves. It will also make them better able to measure their own success.

(b) Topics Well Suited to Concrete Illustration. — In general, topics which have to do with persons and

places and which involve some activity are made clearer by concrete illustration. As examples we might take the story of Daniel Boone or a description of home life in pioneer days. In such illustrations the figures may be placed in significant relations to each other. They may be moved about and made to assume characteristic attitudes and so provide a sort of picture in three dimensions. Such a representation usually carries with it a greater atmosphere of reality than is possible with the picture in two dimensions. Such representations are particularly helpful in the study of topics which deal with contrasts between our present habits and customs and those of other times and places. They are helpful, also, in studies which deal with mechanical apparatus.

The following tables contain a selection of topics in geography and history which are suitable for concrete illustration. These topics are taken from the texts in use in the Columbia schools in the grades indicated, at the time the experimental studies were in progress.

Many topics may be illustrated in a variety of ways. Appropriate forms of illustration are indicated after each topic or group of topics. (See note, p. 79.) In no single instance would it be desirable to use all or even a large percentage of the illustrations listed. The entire list is offered as a suggestion for the selection of topics and in the hope that it may be helpful to the busy teacher who has scant time to study out the many problems incident to her work.

Following the detailed list of topics is given a type of outline for the use of illustrative methods as applied to the geography of South America. This outline may be modified to suit other topics and the conditions of individual classes.

TOPICS FOR ILLUSTRATION

GEOGRAPHY

Suggested list of topics drawn from Tarr and McMurry's New Geography, Book II, with one or more suitable forms of illustration for each. Fifth grade, topics 1-94; Sixth grade, topics 95-194; Seventh grade, topics 195-243.

The letters indicate the form of illustration.¹

	PAGES
1. Relief map of North America: General outlines only; for study of drainage, effect of mountains on winds and rainfall, location of glacier, modification of mountains, etc. (S.)	5-12
2. Plants of North America. In series according to sections (P. B.)	13-22
3. Animals of North America (P. C.)	13-22
4. People of North America (P. B. S.)	22-26
General facts for United States	26-30
5. Color maps and charts showing centers of population farming regions mining regions (P.)	

¹ P. — Poster, including all maps and charts; B. — Illustrated booklet; S. — Sandtable representation; C. — Construction in various materials, including clay modeling.

New England

	PAGES
6. Relief map, showing vegetation (S.)	31-32
7. Occupations	
lumber camp	33-35
quarry	35-36
fisheries	37-38
farming and dairying (P. B. S. C.)	38-39
factories and water power	40
making paper	41
making cloth.	42
making shoes (P. B. C.)	43
8. Cities, illustrated descriptions (B.)	44-46
location on sand and color maps (P. S.)	
9. Products — in review (P.)	33-44
10. Product map — Samples of products fastened to map	

Middle Atlantic States

11. Relief map, showing vegetation and products (S.)	48-50
12. Occupations	
fishing—oyster dredges	51
mining	
salt	53
coal	54
petroleum	56
iron (P. B. S. C.)	56-57
manufacturing	59
pottery, glass, etc. (P. B. S. C.)	
cloth (P. B. C.)	60
iron and steel (P. B.)	58
13. Product posters, showing products and by- products (P.)	51-60

PAGES

14. Cities, typical features, as Brooklyn Bridge,
sky-scrapers, etc.
Famous buildings 62-69
Capital City (P. B.) 67
Erie Canal and locks (P. B. S. C.) 65

Southern States

15. Relief map, showing agricultural processes
(S. C.) 71

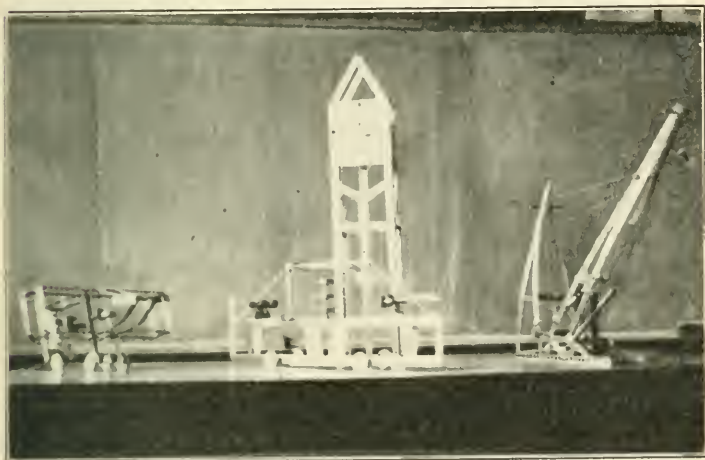


FIG. 30. — Bi-plane, Battleship, Clock; Derrick. Sixth Grade. Humboldt School, St. Joseph, Mo.

16. Occupations
cotton plantation 74-75
sugar plantation 75-76
rice field 76
tobacco field (P. B. S. C.) 77
17. Products in review showing products and by-
products (P.) 73-80
Charts showing increase in production (P.) . . 81-82

	PAGES
18. Cities typical features (P. B.)	81-90
19. Central States — color map (P.)	
Relief map, showing location of cities and typical industries (S.)	92
20. Products and by-products	93-111
corn	95-96
wheat	96
cattle	99-101
lumber	102
iron	103
oil	103
copper (P. B. S. C.)	105
21. Manufacture and Commerce	106-116
Review of manufactured products	
Types of transportation (P. B. S. C.)	106-116

Western States

22. Relief map showing cities and railroad lines (S.)	118-122
23. Occupations	
mining	
gold	122
silver	123
copper	124
coal and oil (P. B. S. C.)	125
24. Lumbering big tree region (P. B. S. C.)	125-127
25. Agriculture	
methods of irrigation (P. B. S. C.)	129-133
varieties of fruits (P. B.)	131-132
stock raising (P. B. S. C.)	133-134
26. Transportation	
ships	139-141
rafts	141
railroads (P. B. C.)	136

	PAGES
27. Typical homes	
Pueblo Indians	142-143
Cave dwellers	143
Sheep ranch (P. B. S. C.)	134
Noted features	
28. Yellowstone Park (P. B.)	143-144
29. Big tree region (P. B. S.)	127
30. Yosemite Valley (P. B. S.)	145
31. Grand Canyon of Colorado (P. B.)	145
32. Alaska — color map (P.)	148
33. Relief map, showing glacier (S.)	148
34. Occupations	
fishing — showing kinds of fish	150-151
mining — placer mine (P. B. S.)	151-152

Porto Rico and Cuba

35. Relief maps (S.)	153
36. Color maps — showing relation to continent (P.)	153
37. Occupations	
sugar plantation	153
tobacco plantation (P. B. S.)	153
fruits (P.)	153-154
38. Native house (P. B. S. C.)	153

Panama Canal Zone

39. Canal and locks (P. B. S. C.)	155
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Hawaiian Islands

40. Relief map (S.)	158
41. Native houses (P. S. C.)	156
42. Population — nationalities (P.)	156
43. Products and by-products (P.)	157

Philippine Islands

	PAGES
44. Relief map of Luzon (S.)	159
45. Color map of group (P.)	159
46. Products and by-products (P.)	159
47. People and houses (P. B. S. C.)	159-160
48. Farming methods and tools (P. B. S. C.) . .	160

British Possessions

49. Historical features (B.)	162
50. Relief map (S.)	161

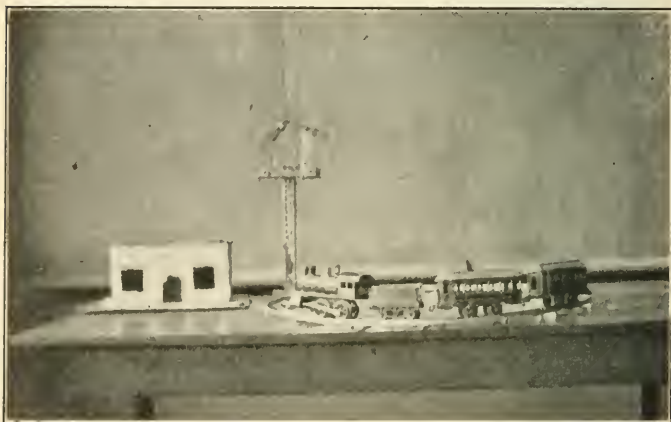


FIG. 31. — Station, Signal Tower, and Train. Sixth Grade. Humboldt School, St. Joseph, Mo.

51. Color map (P.)	161
52. Native animals (P. B. S. C.)	163
53. Lumbering (P. B. S.)	163
54. Fishing (P. B. S.)	164
55. Seal hunting (P. B.)	165
56. Chart of farm regions (P.)	165-166

	PAGES
57. Products (P.)	165-166
58. Transportation	
Railways and waterways (P. S. C.)	167
59. Home of Eskimos (P. B. S. C.)	170

Mexico

60. Historical features (B.)	171
61. Relief map, showing typical homes (S.) . .	171-173
62. Color map (P.)	
Irrigated fields (S.)	173
63. Products	
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methods of manufacture	
methods of transportation (P. B.)	
64. Adobe house (C.)	174
65. Coffee plantation (P. B. S.)	175-176
66. Cities located on relief map (S.)	177
67. Government (B.)	175

Central America

68. Color map (P.)	171
69. Products (P.)	177

West Indies

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71. Relative production of different sections	
shown in miniatures in proper propor-	
tion, as sacks of wheat, baskets of corn,	
etc. (P. C.)	

South America

72. Relief map, showing physical features, vege-	
tation, occupations, towns (S. C.) . . .	237

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73. Color charts, showing	
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rainfall	211
temperature	238
vegetation—forests, prairies, arid regions	
(P.)	238-239
74. Animals (P. B. C.)	239-240

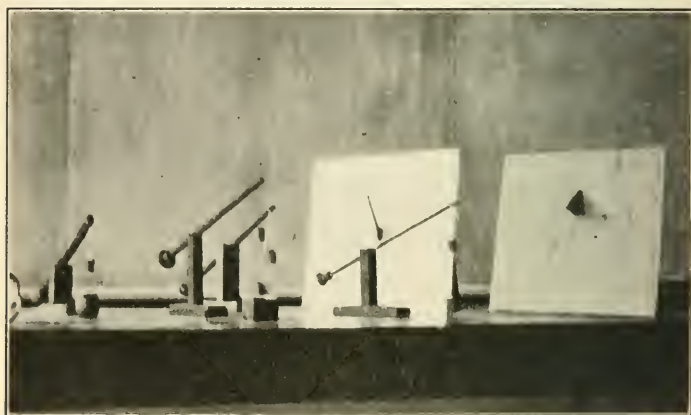


FIG. 32. — Well Sweeps and Sun Dials. Sixth Grade, Humboldt School, St. Joseph, Mo.

75. Natives (P. B.)	241
76. Native houses (S. C.)	247, 246
77. Historical features (P. B.)	241
78. Countries, color map, showing outlines (P.) .	237
79. Products and by-products of each (P.) . .	244-255
80. Cultivation and manufacture of rubber	
(P. B. S.)	244
81. Farming methods in contrast to United States	
(P. S.)	246
82. Cultivation of cocoa (P. B.)	251

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83. Mining methods in contrast to United States (P. S.)	253
84. Cities — located on color map and on relief map (P. S.)	245-255
85. Government of countries (B.)	245-253

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87. Charts of zones (P.)	200-202
88. Charts for winds (P.)	206-210
Charts for rains (P.)	210-217
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89. Charts for ocean currents (P.)	218-223
experiments (C.)	
90. Charts for distribution of temperature (P.) .	224-226
91. Animals — by zones, by continents (P. B. C.)	227
92. Plants — by zones (P.)	228
93. People — charts for races (P. B.)	231-234
94. Religions of world (B.)	233
95. Comparisons of climate and vegetation in	
hot country	229
cold country	227
moist country	228
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96. Color map showing countries (P.)	257
97. Chart maps showing	
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98. Relief map (S.)	263
99. Color charts showing latitude in relation to United States (P.)	263
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101. Charts showing winds and rainfall	264
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106. Cities on relief map (S.)	271-274
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108. Country scene in Ireland (P. S.)	270
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109. Cultivation of flax and manufacture of linen (P. B. S. C.)	271
110. Typical scenes in Scotland (P. S.)	274
111. Scotch costume on doll (C.)	
112. Government of Great Britain (B.)	276
113. Review of products (P.)	277
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Holland

115. Sand map showing dikes (S.)	277
116. Story of the dike building (B.)	277-278

	PAGES
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Costumes on dolls (C.)	
Houses on sandmap (S. C.)	
Dog cart (C.)	
118. Occupations (B.)	278
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Manufacturing (P. C.)	
Use of windmills (P. S.)	279
119. Commerce (P. B.)	280
120. Products (P.)	270-280
121. Famous places, people, and pictures (P. B.) .	280

Belgium

122. Historic features (P. B.)	281
123. Products (P.)	282

France

124. Relief map with cities (S.)	283-284
125. Historic features (P. B.)	283
126. Products (P.)	284
127. Vineyards (P. S.)	284
128. Processes in silk manufacture (P. B.) . . .	285-286
129. The city of Paris (P. B.)	287-288
130. Government of France (B.)	290

Spain

131. Historic features (B.)	290
132. Relief map (S.)	291
133. Occupations	292
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mining (P.)	292
134. Customs — games (P. B.)	293
ox-cart (P. C.)	292
135. Cities on relief map (S.)	294-295

Scandinavia

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136. Relief map (S.)	295
Color map (P.)	295
137. Chart showing relative population of countries (P.)	295, 424
138. Historic features (B.)	296

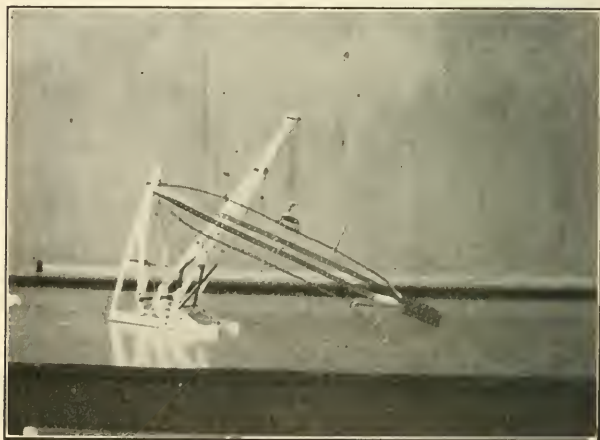


FIG. 33. — Crane Raising a Submarine. Sixth Grade. Humboldt School, St. Joseph, Mo.

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houses (P. S. C.)	296
140. Industries — lumbering	297
fishing	297
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dairying (P. B. S. C.)	299
141. Compare Danish farms with those of Western United States (P. B. S.)	299

Russia

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142.	Comparative size (P.)	302
	with Europe	
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143.	Relief map	256
	with variety of vegetation (S.)	
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145.	Occupations	
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German Empire

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166. Famous scenery (P. B.)	322

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169. People and government (B.)	323
170. Charts showing location in zones for compar- ing climates (P.)	323
171. Industries agriculture and irrigation farm products (P. B. S. C.)	324 325
172. Manufactures silk industry sponge fishing (P. B.)	325 325

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model of Colosseum, etc.	328
175. Venice — on sand map (P. S.)	330
176. Review of products and manufactures (P.)	330



FIG. 34. — A Derrick. Fifth Grade Boys. McKinley School, St. Joseph, Mo.

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180. Government (B.)	332
181. Industries — various scenes on sandtable (S.)	332
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183. Cities — on color map (P.)	

Balkan Peninsula

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186. Charts showing climate and vegetation (P.)	335
187. Peoples (P. B.)	335
costumes (B. C.)	
customs (B.)	
religions (B.)	336
188. Industries — products and manufactures (P. B.)	335-336
189. Governments (B.)	336
190. Historic features (P. B.)	337
Story of Greece (B.)	338
191. Famous buildings in Greece (model Acropo- lis) (C.)	339
192. Current events (P. B.)	
193. Animals of Europe (P. C.)	301
194. Review products of Europe (P.)	

Asia

195. Charts comparing area and population	341, 424
rainfall and climate (P.)	343, 346
196. Color map (P.)	341
197. Charts — showing location in zones (P.) showing vegetation (P.)	343
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199. People historic features (B.)	345-346
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201.	Holy Land — relief map (S.)	349
	ancient and present customs (B.)	349
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Arabian Peninsula and Persia

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Siberia

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205.	Government and people (B.)	353

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206.	Relief map (S.)	354
207.	Rainfall chart (P.)	354
	Population chart (P.)	355
208.	Historic features and religion (B.)	355
	government (B.)	355-356
209.	Products (P.)	356
	tea plantation (S.)	357
	lumbering with elephants (P.)	359
210.	Wagons and buffalo carts (C.)	360

China

211.	Relief map — with wall (S.)	361, 340
212.	Products (P.)	365
213.	Government and religion (B.)	364

	PAGES
214. Houses and costumes (P. C.)	363-364
215. Vehicles (C.)	363
216. Methods of farming and irrigation (P. S.) .	364
silk culture (P. B.)	365
tea culture (P. S.)	365

Japan

217. Relief map (S.)	367, 340
218. Color map (P.)	367
219. History and Government (B.)	368
220. Industries (P.)	369
silk culture (P. B.)	369
tea culture (P. B.)	369
pottery (C.)	370
221. Cities — on relief map (S.)	370-371

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224. Charts showing zones, rainfall and climate (P.)	374
225. Animals (P. C.)	375
226. People — charts showing population (P.) .	376
227. Homes and customs of natives (S. C.) . .	376
228. Foreign owners — chart (P.)	377
229. Scenes in Sahara desert (S.)	378
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Pyramids (B. S.)	
Nile (B. S.)	
Sphinx (B. S.)	
History (B.)	
231. Arab — schools, religion (B.)	383-384
232. Products of Africa (P.)	384-385
233. The English and Dutch in S. Africa (B.) .	384
234. Transportation (P. S. C.)	386

	PAGES
235. People of Central Africa (P.)	387
236. Review of products (P.)	388-389

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237. Relief map of Australia (S.)	391
238. Color map of Australia and Islands (P.)	391
239. Native animals (P.)	392-393
240. People and government (B.)	392-397
241. Charts showing population (P.)	394
242. Products (P.)	395-396
243. Typical native houses (P. C.)	397

HISTORY

Suggested list of topics drawn from Tappan's "Our Country's Story," with one or more forms of illustration suited to fifth-grade pupils. The letters indicate the form of illustration.¹

	PAGES
1. Early ideas of the world (P. B.)	1-2
2. Methods of travel in fifteenth century (P. B. S. C.)	2-3
3. Armor and weapons in fifteenth century (P. B. C.)	3-18
4. Early maps (P.)	4-5
5. Models of early ships (C.)	2-6
6. Routes of Columbus' voyages (S.)	8-10
7. Scenes in New World (S.)	10-11
Explorers and routes	
8. Cabots' route (S.)	13
9. Magellan's route (S.)	17-18
10. De Leon's route (S.)	16

¹ P — Poster, including all maps and charts; B — Illustrated booklet; S — Sandtable representation; C — Construction in various materials, including clay modeling.

	PAGES
11. Cartier's route (S.)	20-21
12. Maps showing all explorations (P. S.)	
13. Settlements in Florida (S.)	24-25
14. Raleigh's Colonies (P. B. S. C.)	26-27
15. Costumes in time of Queen Elizabeth (P. B. C.)	27

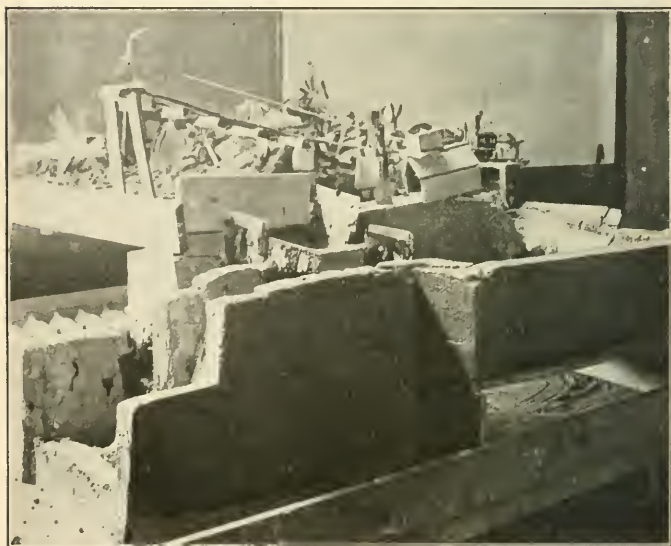


FIG. 35. — A Panama Canal and an Inclined Railway. One tier of locks operated. Works from an old clock operated the railway. Fifth Grade. Columbia, Mo. (See List F.)

16. Vehicles, same (P. B. C.)	29
17. Indian homes and weapons	
canoe	
cradle	
cooking utensils (P. B. S. C.)	34-41

	PAGES
18. Story of John Smith (B.)	43
19. Chart of Virginia Colony (P.)	43-49
20. Scenes in Virginia Colony (P. S.)	
21. Story of Pilgrims (B.)	52
22. Mayflower, pictures (P.)	
models (C.)	55
23. Pilgrims in America	
houses	
costumes	
furniture, etc. (P. B. S. C.)	55-60
24. Puritans — story, journey (P. B. S. C.) . . .	63
25. Quakers — dress, habits (P. B.)	67
26. Indians in New England (P. B. S.)	69
27. Blockhouse (C.)	73
28. Story of Roger Williams (P. B. S.)	75-76
29. New England stockade (P. S. C.)	81
30. New England schools (B.)	66-72
31. Early New England customs (P. B. S.) . . .	83-88
32. Dutch settlements and customs (P. B. S. C.)	89-98
33. Story of William Penn and Quaker settle- ments (P. B. S.)	99-104
34. Maryland plantations (P. S.)	105-107
35. Settlements in Southern Colonies (P. S.) . .	109-114
36. Review charts of English settlements (P.)	
37. Relief maps review (S.)	
38. French explorations	
story and sand map (B. S.)	114
39. Story of war with French (with "Evangeline") (B. S.)	119-128
40. Colonial customs	
houses	
costumes	
vehicles, etc. (P. B. C.)	129-139

41.	Early events of Revolution	
	people, weapons, places (P. B.)	141-153
	famous pictures of Revolution (P. B.)	
42.	Story of George Washington (P. B.)	154
43.	Charts of early battles (P.)	141
44.	Events of Revolution by years (P.)	154
45.	Surrender of Cornwallis (P. S.)	167
46.	Famous people of Revolutionary times (P. B.)	154-170
47.	Story of Franklin (B.)	163
48.	Invention of cotton gin (P. B. C.)	173
49.	Fulton's steamboat (P. B. C.)	183
50.	Emigrant train for West (P. B. S.)	185
51.	Stagecoach in 1825 (P. C.)	188
52.	Early chaise (P. C.)	189
53.	Early freight wagon (P. C.)	189
54.	Erie Canal with locks (P. B. S. C.)	190
55.	Early railroad train (P. C.)	191
56.	Famous statesmen of early history (P. B.) .	192
57.	Noted writers of early history (P. B.) . . .	194
58.	Invention of telegraph (P. B. C.)	199
59.	Discovery of gold in California (P. B. S.) .	202-203
60.	Scenes in North and South before war, in contrast (P. S.)	
61.	Story of Lincoln (P. B. S.)	208
62.	Story of Southern leaders (P. B.)	210
63.	Model of Monitor (C.)	215
64.	Story of U. S. Grant (B.)	222
65.	Review of Civil War, in pictures (P.) . . .	208-228
66.	Famous buildings	
	White House	
	Capitol, etc. (P. B.)	
67.	Laying Atlantic cable (P. B.)	230
68.	Events of Cuban war (P. B.)	241



FIG. 36. — Colonial House, Front View. Fifth Grade, Columbia, Mo.

	PAGES
69. Book of our Presidents (B.)	154-250
70. Charts showing expansion (P.)	

Suggested list of topics drawn from Gordy's "History of the United States," with one or more forms of illustration suited to sixth- and seventh-grade pupils. The letters indicate the form of illustration.¹

	PAGES
71. Review of voyages of Columbus (P. B.)	1-8
72. Charts of Norse voyages (P.)	11
73. Review of Spanish explorations (P.)	13-18
74. Review of English explorations (P. S.)	20-25
75. Review of Virginia Colony	
Color maps and pictures (P. S.)	28-40
76. Review of Pilgrims and Puritans (P. S.)	43-60
77. New England and Virginia in contrast (S.)	28-43
78. Colonial house, etc. (C.)	
79. Review of Dutch in America (P.)	63-68
80. Review of Quakers in America (P.)	68-72
81. Indian customs (P. B.)	75-83
canoes, snowshoes (C.)	
weapons, baskets (C.)	
money, totems, mounds (C.)	
82. Review of French explorations (P.)	87
83. Noted Frenchmen of America (P. B.)	89-92
84. French settlements (P.)	87-98
85. Braddock's defeat (B.)	98
86. Story of Acadia (B.)	99
87. Story of Wolfe and Quebec (P. B. S.)	101
88. New England colonial life (P.)	106
occupations (P.)	106

¹ P — Poster, including all maps and charts; B — Illustrated booklet; S — Sandtable representation; C — Construction in various materials, including clay modeling.

PAGES

Colonial customs (<i>continued</i>)	
education — religion (B.)	106-109
methods of punishment (S.)	109
home life and amusements (P. S. C.)	110
89. Southern colonial life — as above (P. B. S. C.)	111-113
90. Middle colonial life — as above (P. B. S. C.)	113-117
91. Spinning wheels (C.)	113-117
92. Modes of travel in Colonies (P. B. C.)	117
93. Charts showing various forms of government in Colonies (P.)	118-122
94. Charts showing causes of Revolution (P.)	126
95. Poster review of events, leading to Revolution — as Boston Tea Party	139
Boston Massacre, etc. (P. B.)	
96. Map showing early movements of troops (P.)	142-143
97. Minuteman in uniform (P. C.)	144
98. Famous buildings of Revolution (P. B.)	130-153
99. Chart showing Washington's camps and marches (P.)	148
100. Scenes showing famous events, as Washington crossing the Delaware (P. S.)	154
Army at Valley Forge (P. S.)	164
101. Sandmap for Hudson River Campaign (S.)	157
102. Events leading to capture of Burgoyne (P.)	157-163
103. Weapons and uniforms of Revolutionary soldiers (P. C.)	168
104. Story of Franklin (B.)	162
105. Story of George Rogers Clark (B.)	169-170
106. Story of John Paul Jones (B.)	172
107. Pictorial review of ships of the Revolution (P. B.)	172
108. Chart of battles in South (P.)	174-177

	PAGES
109. Story of Benedict Arnold (B.)	177
110. Story of Cornwallis (B.)	179
111. Battle of Yorktown (S.)	181
112. Relief map of Colonies, at close of war (S.)	182
113. Color map — same (P.)	182
114. Scenes showing home conditions at close of war (P. S.)	196
115. Noted generals of Revolution (B.)	
116. Review chart of chief battles (P.)	148-181
117. Color map showing colonial possessions at close of war (P.)	
118. Relief map showing colonial possessions at close of war (S.)	
119. Important people of Revolution (P. B.)	
120. Home conditions at close of war (P. S.) . .	197
121. Modes of travel — stage to railroad (P. B. C.)	198
122. Methods of carrying mails (P. B. S.) . . .	198
123. Story of Alexander Hamilton (B.)	200-202
124. Story of Thomas Jefferson (B.)	200-215
125. Invention of cotton gin (P. B. C.)	204
126. Chart of political parties (P.)	209
127. Scenes in pioneer life (P. B. S.)	216
128. Methods of weaving (P. B.)	218
cotton (C.)	
wool (C.)	
linen (C.)	
129. Lewis and Clark Expedition (P. B. C.) . .	221
130. Chart of causes of War of 1812 (P.) . . .	229
131. Troubles with Indians (P. B.)	228-235
132. Story of Commodore Perry (B.)	232
133. Writing of "Star Spangled Banner" (B.) .	234
134. Color chart for growth of territory — Florida (P.)	239

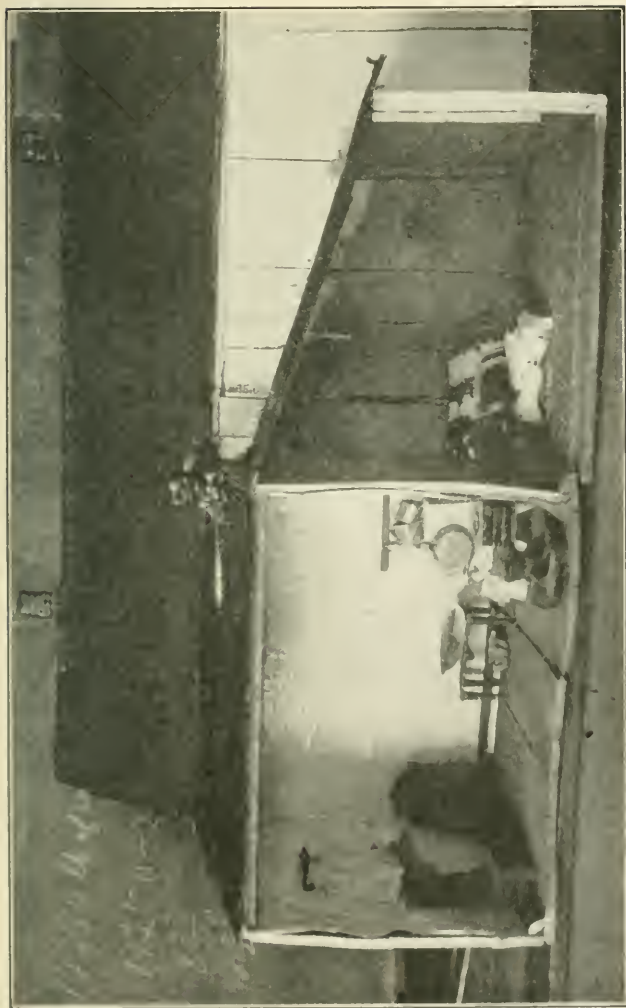


FIG. 37. — Colonial House, Back View. Fifth Grade. Columbia, Mo.

	PAGES
135. Map of National Road (P. S.)	242
136. Story of Henry Clay (B.)	244
137. Erie Canal (P. B. S. C.)	245
138. Great statesmen — Calhoun, Webster, etc. (P. B.)	253
139. The first railroads, showing types of cars used (P. B. S. C.)	257-260
140. Early steamboats (P. B. C.)	264
141. Invention of telegraph (P. B. C.)	267
142. Representation of contrasting conditions in North and South (P. S.)	272-292
143. Chart of Mexican War (P.)	274
144. Discovery of gold in California (P. B. S. C.)	279
145. Chart of route to California (P. S.)	280
146. Modes of travel to West (P.)	282
147. Statesmen in the slavery struggle (B.)	290
148. Chart of causes of Civil War (P.)	275-297
149. Story of Abraham Lincoln (P. B.)	299
150. Model of Monitor (C.)	312
151. Story of U. S. Grant (B.)	315
152. Charts and relief maps of chief battles (P. S.)	316
153. Heroes of Civil War (P. B.)	
154. Story of Robert E. Lee (B.)	324
155. Story of David Farragut (B.)	343
156. Story of Sanitary Commission and Red Cross Association (B.)	350
157. Story of Ku Klux Klans (B.)	361
158. Building Eads bridge at St. Louis (P. B. C.)	366
159. Sugar and cotton plantations (P. B. S.)	368
160. Western mining camps (P. B. S.)	374
161. Modern farming methods in West (P. B. S. C.)	376
162. Immigrants of Western coast (compare with Eastern) (P. B.)	377



FIG. 38. — Booklets. Training Class. Missouri University.

	PAGES
163. Chart of transcontinental railroad (P.) . .	378
164. Artesian well and irrigation system (P. B. S. C.)	379
165. Color chart of Forest Reserves, for United States (P.)	380

	PAGES
166. Color chart of timber for United States (P.)	
167. Trans-Atlantic cable (P. B.)	382
168. Color chart of Alaskan Purchase (P.)	384
169. Invention of typewriter (P. B.)	385
170. Invention of telephone (P. B. C.)	386
171. Invention of sewing machine (P. B.)	387
172. Centennial and other Expositions (P. B.) .	388
173. Brooklyn Bridge (P. B.)	394
174. Models of bridges (C.)	
175. Gift of Statue of Liberty (P. B.)	396
176. Events of war with Spain (P.)	411
177. Heroes of Spanish War (P. B.)	411-413
178. Color map of Philippines (P.)	422
179. Building Panama Canal (P. B. S. C.)	423
180. Literary heroes of United States (P. B.) . .	428
181. Review of administrations, giving events of each in pictures (P.)	

SUGGESTED OUTLINE FOR ILLUSTRATIVE METHODS IN THE STUDY OF SOUTH AMERICA

Text: Tarr and McMurry, Book II, pp. 231-255.¹
Carpenter's South America (revised ed.).

General Facts

1. Model Relief map in damp sand.
 Show coast line
 mountain ranges
 rivers
 forests
 prairies and plains
 arid regions
2. Color charts for which printed or hectographed outline
 maps are used.

¹See explanatory note, page 114.

Show location of South America in zones
direction of winds
relation to ocean currents
rainfall
temperature
vegetation { forests
 prairies
 arid regions

(For suggestions see figures 303 and 334, Tarr and
McMurry.)

The making of the maps may be group projects, each feature of the sandmap being assigned to a small group. Each color map may be assigned to two or three pupils working together. By this method the pupils will check each other's work. For example, the river committee will have difficulty in putting in rivers on the sandmap if the mountain committee has done poor work.

3. Posters — either mounted pictures or sketches.
 Showing wild animals
 domestic animals
 birds, insects, reptiles

Countries

1. Trace the boundaries of the several countries on the relief map.
2. Make individual color maps of continent showing countries, using printed or hectographed outline maps.
3. Make individual color maps of each country or group of small countries.
4. If time is allowed for an exhaustive study, make relief maps of the various sections on the sandtable.

5. Study the productive possibilities of the countries by means of charts, showing rainfall, drainage, temperature, etc.

Products

Make posters showing products and by-products. These posters should be individual work, each pupil covering the entire field, as a method of study. The posters may be planned in two ways.

1. By countries — each poster or series of posters showing the productions of a single country.
2. By products — each poster showing a single product with its by-products, and methods of cultivation and manufacture.

For example: Rubber

methods of cultivation
methods of manufacture
things made of rubber
rubber-producing districts

Industries

1. Sandtable illustration of most typical industries and those least familiar to us, such as,
rubber making
coffee growing
banana culture
cocoa culture
2. Posters. Illustrate the chief occupations and industries of each section or country in a series of posters on one of two plans.
 - A. Let country be the unit and show chief industries of that country, as, The Industries of Brazil.
 - B. Let the industry be the unit and show its nature and extent.



FIG. 39.—Studies in Transportation. Twenty five-minute Sketches in Brushwork. Fourth Grade. Columbia, Mo.

This may be made individual work for each pupil, the topics being so distributed that the assembled results will bring out all the points under both heads. Children learn much in explaining their respective projects to each other.



FIG. 40. — Pose Studies in Peasant Costumes Correlated with Geography of Europe. Sixth Grade. Columbia, Mo.

II

Collect samples of woods, minerals, vegetable fibers, grasses, etc.

Excellent prepared exhibits of various products are to be had for reference purposes. These do not, however, create the interest aroused in a single sample brought in by a member of the class. We

prize that which costs us effort. After trying to find suitable samples themselves, the children will better appreciate the value of the prepared exhibit.

Make models of tools of especial interest.

Contrast either by poster pictures or by modeling or by both — the difference in tools and methods used by primitive tribes and the more progressive sections. Seek the reasons for the difference and its effect.

Make comparisons between South America and other countries in volume of production and commerce.

For example:

Make coffee-pot to represent amount of coffee grown in South America, another for coffee grown elsewhere, another for coffee shipped to United States.

Make wheat sack to represent size of wheat crop in South America, another to represent size of wheat crop in United States, another to represent size of wheat crop elsewhere.

Measure and cut out pieces of cotton cloth, woolen cloth, etc., to represent the volume and value of these industries compared with other parts of the world.

The People

1. Let class make sandtable illustrations to show interesting types of home life, including
 - houses
 - cooking utensils
 - furniture
 - clothing
 - vehicles

2. Show same items in individual posters.
3. Show typical methods of travel by models, by posters, or by both.

Government and History. — Each country should form the subject of an illustrated booklet containing a description of the conditions peculiar to that country, with pictures of its important buildings, famous people, important commercial and industrial features, form of government, etc., summing up what has been learned in the general reading and study. Each pupil should write upon one country.

Explanatory Note. — The foregoing outline follows the order of the Tarr and McMurry text and presupposes a previous reading of a description of the country such as is found in Carpenter's "South America." Where such previous work has been omitted, the writer would prefer to reverse the order and introduce the subject by a study of home life and industrial occupations accompanied by abundant concrete illustration. Such an introduction would tend to awaken a personal interest not only in the people but in their environment also, as an explanation of the contrasts between their lives and our own, and would make a later systematic study of the *general facts* more vital than it is when pursued in a formal fashion.

The projects suggested in the preceding outline might be carried out, perhaps with increased interest, in the order suggested in the following brief outline,

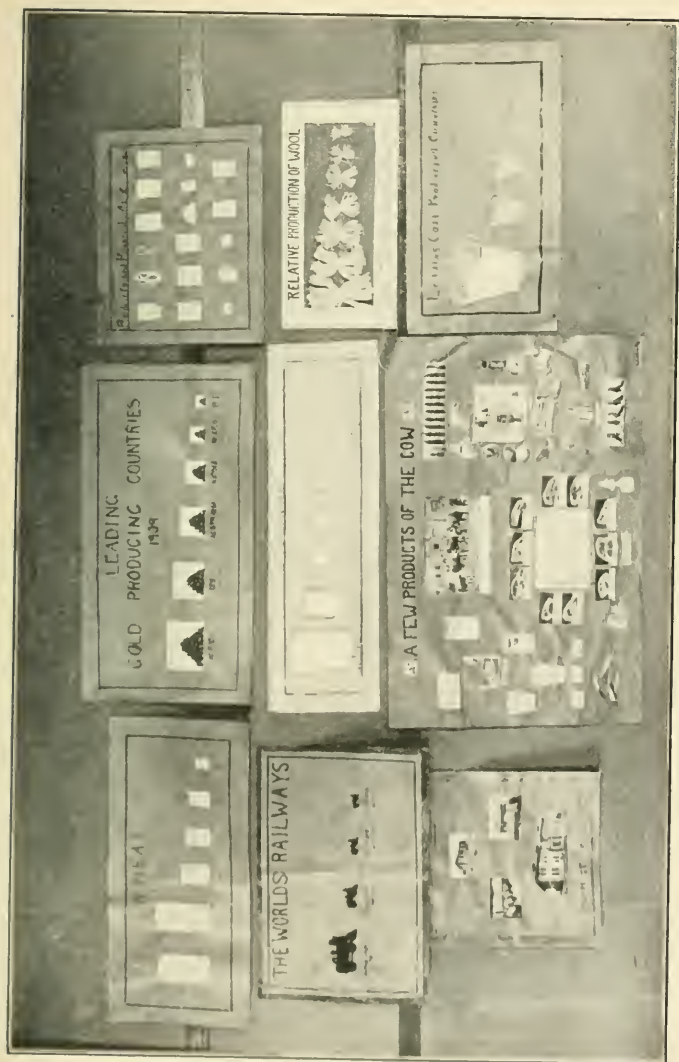


FIG. 41. — Statistical Posters. Training Class. Missouri University.

which is based upon the idea that the study of a country should be approached through its most interesting feature, namely, the people and their habits which form a contrast to our own. This will include home and industrial life. The animal life of a country is also of intense interest. The pupil's interest may be tested by the parts of his text which he reads on his own initiative before lessons are assigned.

Brief outline :

Home Life

Houses, utensils, costumes, religious customs
Studied through pictures, descriptions, and models

Industrial Life

Farming, — crops, tools, machines
Mineral and forest products, — collections of samples
Animals, — posters and pictures
Charts showing comparative values

Physical Features

Contour maps in damp sand and dough
Vegetation and rainfall charts

Commerce

Chief cities, harbors, railroads, located on maps
Discuss reasons for growth of cities at certain points
and relation to trade routes

Countries

Boundaries, physical features, industries

Government

Form of government
Schools and educational standing
Chief historical events

CHAPTER IV

LISTS OF PROJECTS CARRIED OUT BY VARIOUS TEACHERS

A QUESTION is frequently raised as to the amount of illustrative work desirable in any one class. Each of the following lists shows the projects carried out by one teacher during one year, at the time these special studies were in progress. It will be noted that the lists vary greatly in length. The only rule to be laid down for the use of illustrative projects is that they should be used when they add to the efficiency of the study in progress. Much depends upon the teacher's ability to guide the work into profitable channels and to inhibit any tendency toward purposeless playing with materials. Mere making for the sake of making is a waste of time. It is impossible to lay too much emphasis upon the importance of the thought values to be gained through illustrative projects.

LIST A, GRADE FIVE

History

- I. Series of posters, illustrating story of Columbus.
- II. Sandtable illustration for Daniel Boone. Combined with study of geography of Mississippi Valley.

- III. Sandtable illustration showing life of Pilgrims, with cabins, costumes, etc.
- IV. Sandtable illustration for Lewis and Clark expedition, showing physical features of region and important events of journey.

In connection with reading —

- V. Sandtable illustrating story of Robinson Crusoe.
- VI. Series of booklets on Longfellow.

Geography

- I. Sandtable and construction showing Panama Canal, with locks, steam shovel, and railroad.
- II. Sandtable illustration of gold mine in California, showing placer method, figures with cradles and pans.
- III. Series of booklets on birds of United States. Individual.
- IV. Series of booklets on South America. Individual.

The booklets and posters in this series were made during study periods as regular class work. The sandtable illustrations were made mostly out of regular class hours. See List B by same teacher in following year.

LIST B, GRADE FIVE

History

- I. Sandtable illustration for story of Daniel Boone, showing stockade at Boonesborough, cabins, house in Missouri, etc.
- II. Series of individual booklets on Boone.
- III. Sandtable illustration of Pilgrim home life.
- IV. Series of booklets on Pilgrims.
- V. Series of posters on Pilgrims.



FIG. 42. — Pose Work with Stories and Games. Third Grade.
Columbia, Mo.

- VI. Sandtable illustration showing events in life of Washington.
- VII. Colonial cabin of two rooms, showing kitchen and cooking utensils, furniture, bed, dolls in costume.

List B by same teacher as List A. Work done almost wholly in class time as regular study and recitation.

Geography

- I. Sandtable illustration of lumber camp. Cabin, flume, mill, and ice road.
- II. Sandtable illustration of gold mine with mining machinery.
- III. Sandtable relief map of California.
- IV. Sandtable representation of salmon fisheries and cannery.
- V. Series of books on birds.
- VI. Series of books on trees.
- VII. Series of posters; each state with its products and industries.
- VIII. Series of posters showing evolution of transportation by land.
- IX. Series of color charts showing products and industries of Missouri.

LIST C, GRADE FIVE

History

- I. Sandtable problem illustrating Battle of Quebec, showing fort on plateau and soldiers.
- II. Sandtable problem showing events in life of Lincoln.

Geography

- III. Sandtable illustration for Philippine Islands, showing home life.

LIST D, GRADE FIVE

Geography

- I. Series of booklets on industries of the United States.
- II. Series of posters on Philippine Islands.
- III. Sandtable illustration for Salt Lake City and vicinity, showing process of irrigation.
- IV. Sandtable illustration of Philippine village.

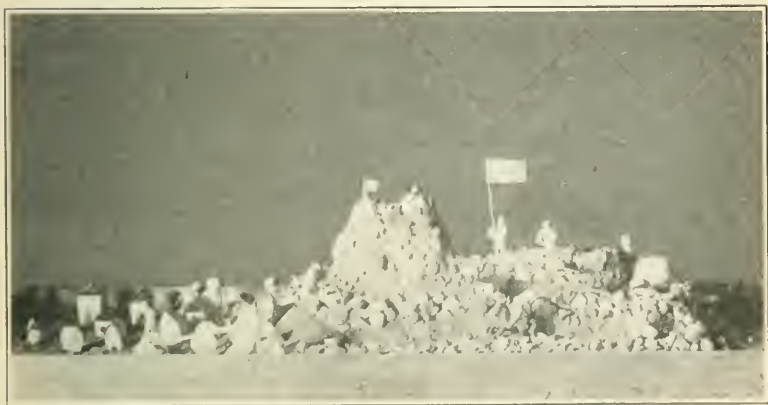


FIG. 43. — The Battle of Quebec. Fifth Grade. Columbia, Mo.

- V. Numerous spontaneous illustrations on sandtable, showing outline of country or state, river valleys, tributaries, etc., quickly made during recitation and destroyed soon after.

Numbers I and IV were all done in study period as regular work.

History

- I. Series of booklets containing a collection of history papers. Made during regular study hours.

In addition this class made booklets on other topics — five series in all, and three series of posters. All done as method of studying the subject.

LIST E, GRADE FIVE

(With Grade Four)

History

- I. Booklets on New England States. Illustrated by pictures of famous places mounted on separate sheets, and colored maps.
- II. Sandtable scene — Bunker Hill. In first attempt on sandtable, grass and corn were planted, but froze during the Thanksgiving holiday. A second attempt turned out well.
- III. House framed and furnished. Used chiefly in connection with arithmetic for papering and plastering problems.

LIST F, GRADE FIVE

History

- I. Sandtable. Routes of explorers shown on sandtable with ships and flags of each country.
- II. Series of problems on sandtable illustrating Colonial life.
 - a. Virginia — figures showing gentlemen — not laborers.
 - b. Holland — map with dikes, mills, etc.
 - c. Pilgrims — Plymouth Rock — town of seven huts, people shown as poor.
 - d. Puritans — people shown as well-to-do, schools, including Harvard.
 - e. Rhode Island — Roger Williams and Indians represented.
 - f. Connecticut — showing Hooker's trip from Massachusetts.
- III. Sandtable illustration showing Boston Tea Party.
- IV. Constructions — models of inventions.
 - a. Fulton's steamboat.

b. Telegraph — not well worked out.

c. Cotton gin — good model.

V. Series of posters showing events of each administration.

VI. Series of booklets and posters for general review of history.

Geography

I. Sandtable map of New England, showing industries in small constructions.

II. Individual posters on New England industries.

III. Sandtable illustration of lumber camp in Maine, with cabin, mill, sled, etc.

IV. Sandtable illustration for fishing, showing hatchery, spawn pond, oyster dredges, etc.

V. Series of constructions showing industries of Middle States.

a. Coal mine, with shaft.

b. Brick kiln.

c. Oil well with derrick.

d. Salt mine.

e. Iron mine.

f. Glass factory.

g. Pottery.

VI. Sandtable illustration of Southern plantation and turpentine farm.

VII. Sandtable for Western States showing mines.

a. Hydraulic, panning gold.

b. Shaft mine and ore crusher.

VIII. Series of color maps for each section.

XI. Series of rainfall maps.

X. Series of color maps showing mining centers.

XI. Sandtable illustration for Panama — showing canal with locks — locks made to lift the boats up and down quite successfully.



FIG. 44. — Cabin, Sawmill, and Timber from a Sand-table Lumber Camp. Windlass and Hoist from a Coal Mine Illustration. Oil Well Machinery. (See list F.)

LIST G, GRADES FIVE AND SIX

History

- I. Sandtable illustration for Columbus Day. Figures made before table was provided proved to be too large when table was received. Class discouraged and subject rested for several days. On Columbus Day geography period (one-half hour study, one-half hour for recitation) was given over to illustration on sandtable. A good piece of work was done in one hour.
- II. Sandtable illustration of Colonial life showing log cabins, spinning wheels, well-sweep, ox carts.
- III. Series of booklets on American heroes.

Geography

- I. Lumber camp on sandtable, in connection with reading of "Building of the Ship."
Time — spare minutes during two or three days.
- II. Life in Holland (Grade Six) showing canals, dikes, windmills, etc.
Time — Lesson periods for five days; work done by small groups while others were occupied at seats.
- III. Series of booklets on European countries.
- IV. Southern plantation on sandtable (Grade Five), including several houses and many clay figures, cotton-fields of real cotton stalks.
Time — Done in odd minutes while class was studying the Southern States.
- V. Scottish scene (Sixth Grade) in connection with geography of Europe and "Lady of the Lake;" castle in cement, real grass growing on island and hills.

(See Fig. 1, Page 3.)

LIST H, GRADES FIVE AND SIX

History

- I. Sandtable illustration of Indian camp.
- II. New England kitchen, showing furniture, dolls in costume, etc.

Additional work in other subjects:

Series of booklets in arithmetic.

Series of booklets in language.

Series of booklets illustrating poems.

The work in this class was done almost entirely during study hours.

Geography

- I. Series of booklets on European countries, by Sixth Grade.
- II. Series of posters for each European country, by Sixth Grade.
- III. Series of booklets on each group of states, by Fifth Grade.
- IV. Series of posters for Middle States.
- V. Series of posters for Western States.
- VI. Community posters for:
 - Central States, by Grade Five.
 - Western States, by Grade Five.
 - Europe, by Grade Six.
- VII. Constructions — European vehicles, by Sixth Grade.
 - Dutch milk cart, Irish jaunting car, Russian droshky.
- VIII. Sandtable illustrations including:
 - a. Lumber camp.
 - b. Coal mine.
 - c. Holland.
 - d. A farm.
 - e. Relief maps.

LIST I, GRADES FIVE AND SIX

History

- I. Sandtable illustration for early settlement period, showing settlement at one end of table, Indian village in forest at opposite end.
- II. Sandtable illustration for Bunker Hill, arranged by girls.
- III. Series of posters illustrating United States history to Revolution. Class in three groups under captains who assigned topics.
- IV. Poster review of the year's work in history. Class in three sections under captains.
- V. Series of posters illustrating a quotation from "The Courtship of Miles Standish" read in connection with history. Each pupil chose a quotation and made an illustrative sketch.

Geography

- I. Series of booklets on South America. Class in three groups on three topics.
Time — Class work and home reading for one week.
- II. Sandtable scene showing Western prairie, with dugout, etc. by boys.
Time — one hour.
- III. Illustrated booklets, describing countries of Europe.
Class worked in three sections under captains.
- IV. Sandtable problems to accompany No. III.
First section — Spanish scene.
Second section — Dutch scene.
Third section — Russia and Scandinavia.

This class made several sandtable illustrations for literature work — including "Snowbound" and "Home of John Burroughs."

LIST J, GRADE SIX

History

- I. Sandtable illustration for Columbus Day. Parallels and meridians located by strings stretched across table. Cuba, South America, Florida in relief in sand, figures in cardboard. "Bad boy" interested in making boats.

Geography

- I. Lumber camp on sandtable, showing log cabin, flume, ice road, loaded wagon, sawmill with engine.
Written work accompanying above:
Diary of five days' visit to a lumber camp.
Letter written from camp to some one at home.
- II. Sand map of British Isles, showing parallels and meridians, cotton and wool manufacturing district, coal industry, and important cities.
- III. Sandtable and construction, home life in Holland, showing:
well made Dutch house with appropriate furnishings.
windmill with wheel operated by spring.
garden and farm implements.
cattle in clay.
people in costume (dolls).
- IV. Sandtable and construction, castle on Rhine of stones and cement, in appropriate setting on sandtable.
- V. Sandtable and construction, Lapland home, showing hut of mud and stone, reindeer and sled, people in costume (dolls).
- VI. Sandtable and construction, life in South Russia, showing thatched hut.
- VII. Sandtable and construction, relief map of Italy, showing St. Gothard tunnel, Tower of Pisa, Vesuvius, orange grove, macaroni factory, etc.



FIG. 45. — The Landing of Columbus. Cords Stretched to Locate Parallels and Meridians. Sixth Grade. Columbia, Mo.

LIST K, GRADE SIX

History

- I. Series of posters, illustrating Colonial customs, costumes, and travel.
 - II. Series of booklets on Heroes of Revolution.
- Both series done in study period.

In addition this class made,

Booklets:

Language — two sets.

Reading — one set.

Drawing — one set.

Posters:

Drawing — one set.

All work done in study period.

Geography

- I. Series of posters on Europe, showing products, houses, vehicles, flags, rulers, etc.
- II. Series of booklets on countries of Europe. Both done in study period as regular work.
- III. Dolls dressed in costume of European countries. Work done out of school hours, at home and at recesses; sewing by girls, wooden shoes, rake, etc., by boys.

LIST L, GRADE SIX

History

- I. Construction — costumes and scenery for original drama on "Columbus at Court of Spain."

Time — class hour and periods before school for week preceding Columbus Day.

- II. Sandtable illustration for French and Indian War, showing French homes, American homes, French fort.

Time — of selected groups during two class periods.

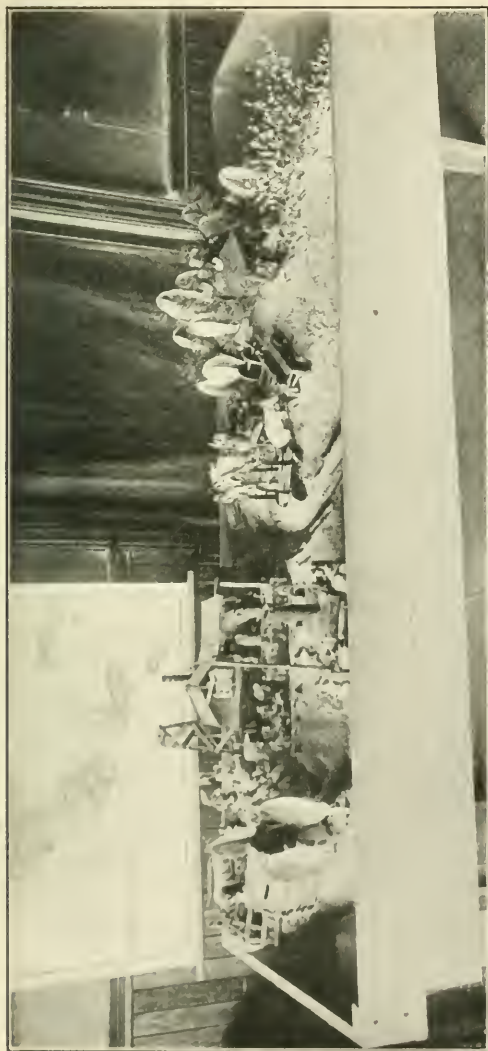


FIG. 46. — Industries in Southern States. Cottonfield and Packing House, Mining, Lumbering, Cattle Raising, Native Fruits, and an Oil Well were Shown. Fourth Grade. Columbia, Mo.

- III. Sandtable illustration of scenes at Valley Forge, showing soldiers and tents on snowy field, blood prints in snow.

Geography

- I. Posters illustrating products of South America.
Series by each pupil.

Time — class hour for study during time devoted to topic — about two weeks.

- II. Sandtable illustration for Scandinavian region, showing rugged coast line and home life.

- III. Sandtable illustration for Italy. Table in two sections, girls showed Venice in one part, and boys showed Rome in another part.

Time — study hour — half hour period.

LIST M, GRADE SIX

History

- I. Series of posters as review of administrations.
II. Series of Hero Books.

Also :

Series of posters in nature study.

Series of posters on stories read.

Several series of booklets giving outlines of books read, as "A Dog of Flanders," "Rebecca of Sunny Brook Farm."

This class did exceptionally strong work from the artistic standpoint in the preparation of their booklets and posters.

Geography

- I. Series of posters on products.
II. Series of booklets on countries of Europe.

These were both done in regular study periods as method of studying subject.

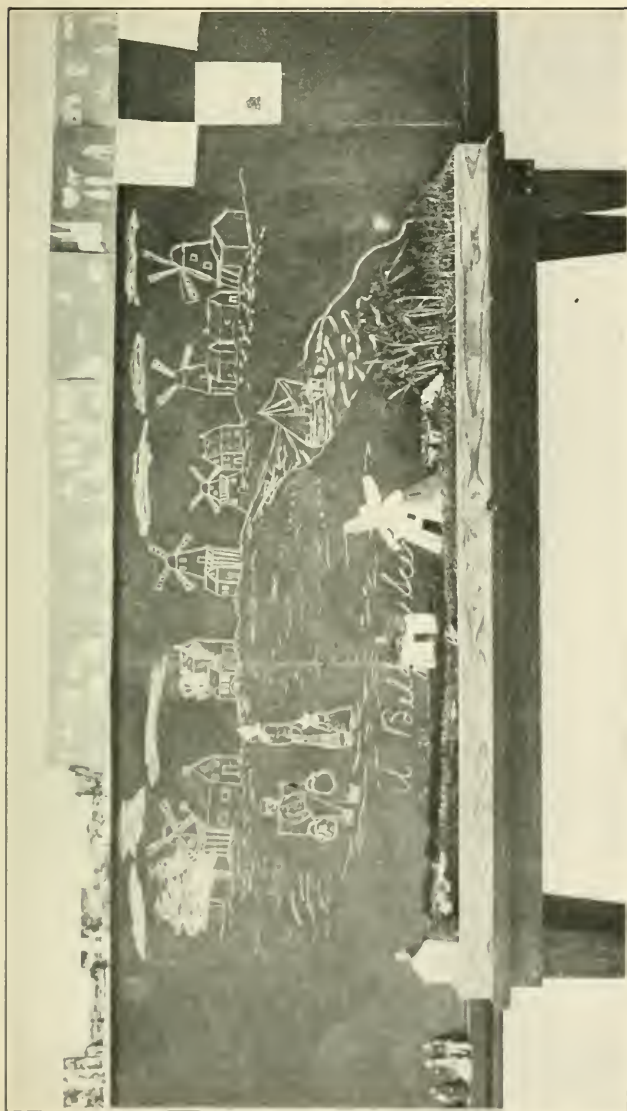


FIG. 47. — A Dog of Flanders. Sixth Grade. Columbia, Mo.

III. Sandtable illustrations for

- a. Ireland
- b. Holland
- c. Scotland
- d. Italy

These were made almost entirely in study periods.
Extra time, if any, not over one hour during week in which illustration was made.

IV. Numerous spontaneous illustrations on sandtable while topics were under discussion. These regarded by teacher as most helpful use of the sandtable.

V. Constructions — vehicles used in Holland, Ireland, Belgium, Russia and Spain.

VI. Swiss peasant cottage.

VII. Venetian gondola.

VIII. Volcano in eruption — built on sandtable.

These were individual constructions made chiefly at home and out of class hours.

LIST N, GRADE SIX

History

- I. Series of posters on events of Revolution.
- II. Series of posters on "Evangeline" and "Courtship of Miles Standish" (read in connection with history).

Geography

- I. Series of booklets on each country of Europe.
Time — study hour, as method of study.
- II. Sandtable illustrations for
 - a. Holland
 - b. London
 - c. Castle on the RhineMade almost entirely during study periods.



FIG. 48. — Venice and Rome.

Two type views worked up in a thirty-minute period, a contest between a group of boys and a group of girls. The vote decided in favor of the girls and Venice.

LIST P, GRADE SEVEN

Geography

- I. Series of posters showing productions of Asia. Each poster made by two pupils.
- II. Series of posters showing life in Africa, animals, products, caravan, etc.
- III. Poster review of industries in foreign countries.
I, II and III all done in regular study hour as the method of studying these topics.

History

- I. Sandtable map of United States showing extension of territory including measurements in proportion.
Time — Prepared during regular study period by small groups working in turn — each group responsible for certain part.
- II. Sandtable — life in the thirteen colonies, showing early conditions.
Time — study hour during a week of review, work apportioned as in I.
- III. Relief map of United States, showing development from colonial times to 1850, including Penn's Treaty with Indians, post roads, Southern plantation, and California gold fields.
Study periods for ten days — apportioned among five groups.
- IV. Booklet on Reconstruction Period, original sketches for illustration, original designs for covers.
Time — two recitation periods.

LIST R, GRADE SEVEN

History

- I. Series of Hero Books containing several stories each.
- II. Washington and Lincoln — February celebration.
Class divided into two groups, one on each topic.

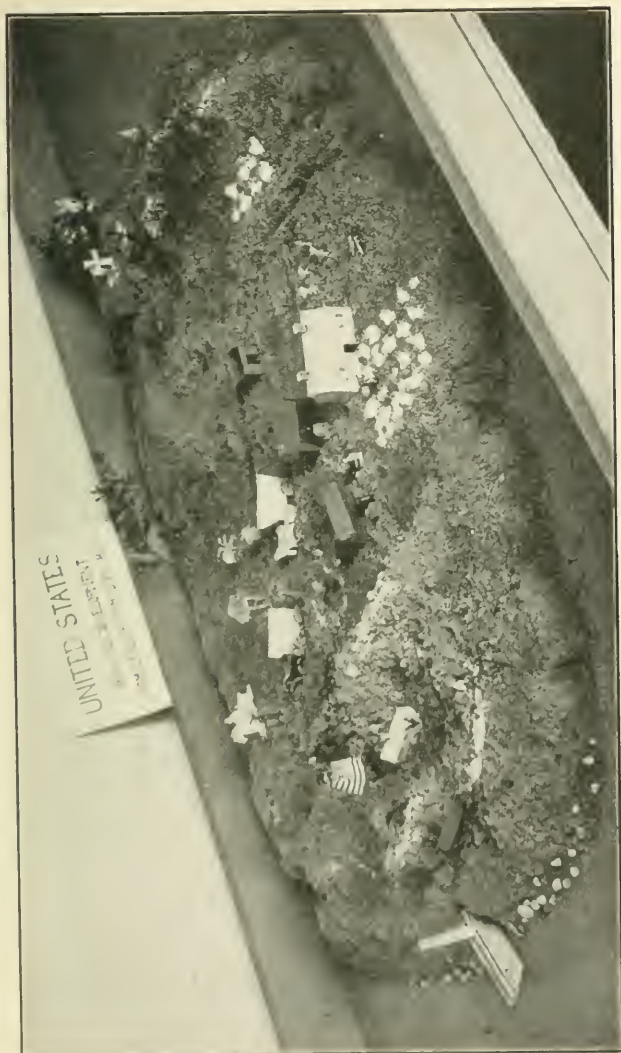


FIG. 49. — Typical Events in United States before 1850. (See Project II. Page 144.)

Each pupil made a booklet. Each division made a sandtable illustration of the home of the hero. This study included a debate on the services performed by these two men.

Time — study hour and part of recitation periods during week preceding holiday celebrated.

III. Booklets on Farragut.

IV. Series of posters showing principal events of each administration. Each pupil made two posters.

Time — study period.

V. Construction. Model of cotton gin, made by one boy at odd times. Model of carpet loom, made by a group of boys during study periods.

Geography

I. Series of problems on Asia, including individual posters and booklets on each of the topics:

a. Holy Land

b. India

c. China

d. Japan

II. Sandtable illustrations to accompany each of four topics in I. (See Project No. 1.)

III. Series of individual booklets on Africa.

IV. Series of individual booklets on Australia.

Time for I, II, III, and IV — regular study period.

V. Quick work at sandtable during recitation to illustrate topic under discussion, as Jordan River and Dead Sea.

In addition to work in history and geography this class made booklets in English and nature study, a Color Note Book in art, and one or two sandtable illustrations for English. Their illustration for the "Legend of Sleepy Hollow" was one of their best efforts.

LIST S, GRADE SEVEN

History

- I. Series of booklets on Presidents.
- II. Series of booklets on Inventors.
- III. Series of booklets on Generals of Civil War.

Geography

- I. Series of posters on products of Asia.
- II. Series of booklets on countries of Asia.
- III. Sandtable used for quickly made relief maps.

In addition, in connection with art study, house built and furnished; posters on Halloween, Christmas, and Easter.

CHAPTER V

SELECTED PROJECTS IN DETAIL¹

PROJECT NO. I

Subject :

Geography in the Seventh Grade.

Field, Asia.

Text, Tarr and McMurry, Book II, pp. 341-371.

Problem of Project. — (a) To use illustrative methods which would employ a variety of forms of expression. (b) To secure self-expression and self-directed activity by throwing each pupil on his own responsibility in illustrating some phase of the subject.

Problem of Pupils. — To make either a poster or booklet or share in a sandtable illustration which

¹ The first eight of the following projects are taken directly from the report in which they first appeared. In these projects particular attention is paid to the time element, since one purpose of the experiments was to discover whether these methods could be carried out without increasing the time allotted to the subject. Many of the other projects outlined were carried out as ordinary school work but did not form a part of the experimental studies. In these it is not always possible to give an accurate statement of the conditions affecting the results, and some items are necessarily omitted, such as the texts used, the time required, and the number of pupils doing the work. The projects were all carried out under conditions common to all school rooms, one purpose of the entire study being to disturb the regular habits of the class as little as possible.

would illustrate the important features of the topic under discussion.

Form of Illustration. — Posters, booklets, and sandtable with some construction.

Conditions. — Class of thirty-five pupils under a strong, experienced teacher.

Time. — Regular lesson period of one-half hour daily. No extra time. Each phase of subject occupied from three to five periods, or from one and one-half hours to two and one-half hours.

Organization of Class. — Class divided into three groups. The first group made posters; the second group made booklets; and the third group made a sandtable illustration. Groups were rotated as a new topic was taken up.

Organization of Subject-matter. — Four general topics were selected for study: Holy Land, India, China, and Japan.

Text used first, followed by supplementary reading from every available source.

After a general class discussion each pupil tried to express his idea of the important features by means of an illustration.

Detail of Method. — Posters. Each pupil of the poster group was directed to prepare a poster which would illustrate his conception of the important features of the topic under consideration with reference to physical characteristics, products, home life and industrial methods. These features were to be

shown in pictures and sketches arranged upon a sheet of drawing paper, according to the worker's idea of good taste.

After the posters were completed they were compared and criticized from the standpoint of topics illustrated, arrangement of pictures, and lettering. Each group made a marked advance over the preceding group in the quality of the work done. Great improvement was shown by the first group in making the second set of posters after having had the benefit of the criticisms on the work of groups two and three, as well as upon their own. The growth in art appreciation was shown by the ability of the pupils to estimate their own productions before other comments were made.

Detail of Method. — Booklets. The members of the booklet group were directed to prepare written descriptions of the important features of the country, giving especial attention to government, religious customs, and features not so easily portrayed without the use of words. The descriptions were to be illustrated as the writer desired and bound appropriately.

Each group made improvement on the work of the preceding group, especially in the character of illustrations and cover. The first covers were on white paper, some of them lettered in pencil and the lettering not very well done. The later covers were made of gray and green papers, lettered carefully

in India ink, with the addition in some cases of an appropriate design. Some of the books on Japan had the title in Japanese characters, which the writers had learned by conferring with Japanese students in the University.

Detail of Method. — Sandtable. The sandtable problems took the form of relief maps, which were placed in relation to the parallels and meridians. These maps were, of necessity, small, and only the main features and general contour of the land could be shown. Forests were indicated by groups of paper trees. Typical industries were shown by clay figures and by pictures of people at work set in the proper locality. Flags bearing the national emblem were used to locate the important cities. Typical houses constructed from paper, wood or clay were shown in miniature.

Correlation. — This problem was based upon geography. The making of posters gave opportunity for development in artistic appreciation. The writing of the descriptive matter for the booklets furnished material for practice in composition. The sandmaps required practice in measurement including problems in longitude and latitude. The entire problem served as a motive for reading in the search for information needed in each project. The discovery of a practical use for printing in the making of posters and book covers, awakened a lively interest in learning to make good letters.

PROJECT NO. II

Subject:

History in Seventh Grade.

Topic: Development of United States to 1850.

Text — Gordy, pp. 185-281.

Problem of Project. — To use sandtable illustration as a means of emphasizing strong points in a general review.

Problem of Pupils. — To make a relief map of the United States and show thereon typical features in the development of the country.

Conditions. — Class of forty pupils under a strong, experienced teacher.

Type of Illustration. — Relief map on sandtable.

Time. — One lesson period for each of six groups. Period, one-half hour for study, one-half hour for recitation. Total time in class, six hours. Some details finished out of class time.

Organization of Class. — Class divided into six groups. Each group had a definite part to perform and was allowed one lesson period in which to place its contribution on the table.

Organization of Subject-matter. — As a form of review the subject was subdivided into topics covering a period in national development and one incident chosen as typical of that period, — each incident to be represented by an appropriate illustration.

Method in Detail. — Each group planned its illus-

tration and put it in place. To the first group was assigned the task of preparing the map on the sandtable. The completed project showed William Penn making treaty with Indians, a corduroy post road, a Southern plantation, a fort at St. Louis, and the discovery of gold in California.

Correlation. — This problem was based upon history. Making the sandmap involved a review of the geography of the United States; explaining the various features gave practice in oral description. No written work accompanied this problem. Making the sandmap required considerable practice with numbers in getting the proper proportions.

(See Figure 49.)

PROJECT NO. III

Subject:

Geography — Sixth Grade.

Field — Europe.

Text — Tarr and McMurry, Book II, pp. 257-340.

Problem of Project. — To discover to what extent the sandtable constructions could be used with good results in illustrating home and industrial life, special emphasis being laid upon knowledge of the people as an incentive for studying the physical conditions of the country.

Problem of Pupils. — To build a miniature house of the type used in a given country, with characteristic furnishings and people in characteristic

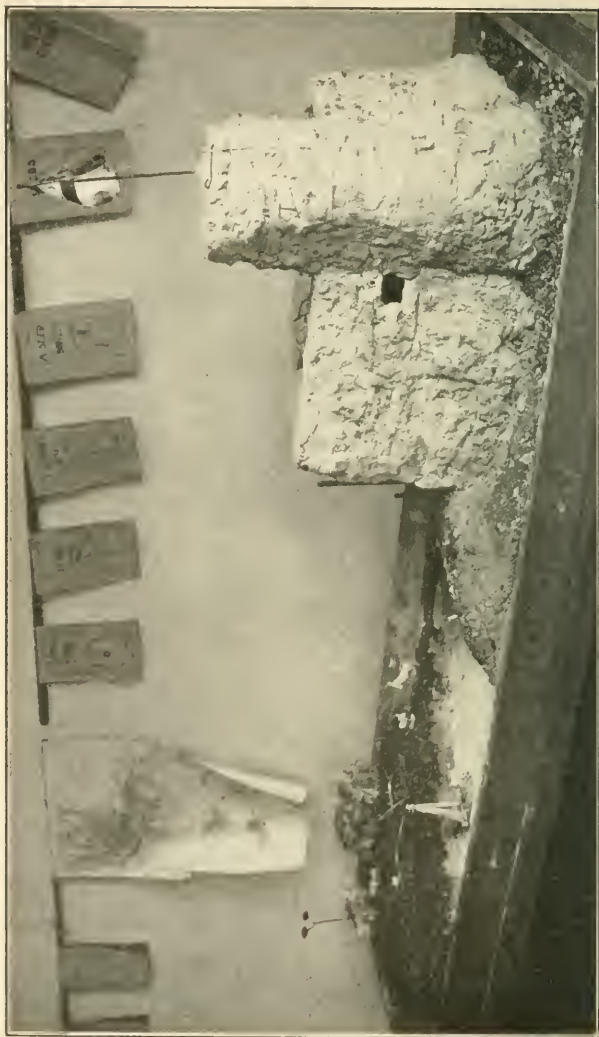


FIG. 50. — A Castle on the Rhine. (See Project III. Page 149.)

costume, the house to be set up on the sandtable with appropriate surroundings.

Form of Illustration. — Construction with the sandtable for a background.

Conditions. — Class of thirty-eight pupils under a strong and experienced teacher.

Time. — Full time devoted to entire subject was a little under six months; to sub-topics an average of two weeks, varying with the importance of the country. Actual time on any one topic was the period before school morning and noon, and odd minutes during the day. Very little class time was used in this instance. Actual time spent amounted to less than one-half hour daily for eight or ten days by a group of five or six pupils.

Some countries were not represented, through some accident to the construction or lack of energy on the part of the group, or were crowded out by the pressure of other work and the lure of the first spring days.

Organization of Class. — The class was divided into groups of five or six pupils, each group constructing a house, typical of a given country. As the houses were completed they were set up on the sandtable and some scene typical of the customs of the people was arranged as a background.

While each house was being built, the physical features of the country it represented were studied in their relation to the home and industrial life of the people.

Organization of Subject-matter. — The countries were taken up in the order followed by the text. The text was supplemented by Carpenter's "Europe" and numerous other descriptions found in the school



FIG. 51. — A Dutch Farm. (See Project III. Page 148.)

library and brought by the children from their home libraries.

Method in Detail. — British Isles. Shown by sand map only. Cords stretched for parallels and meridians. Small representations to locate mining and manufacturing districts. Cities located by flags.

Holland. Dutch house with red tile roof, interior decorations in Delft blue, tulip garden, dolls in Dutch costumes, windmill turned by wire spring, mill of

clay modeled over a milk bottle, cattle modeled in clay.

Northern Europe. Laplander's hut in mud and stones, reindeer and sled, people (dolls) in costume, entire scene snow covered. (See Frontispiece.)

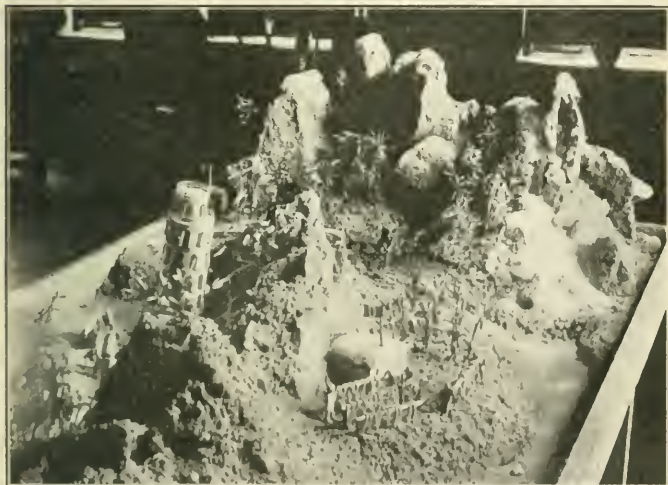


FIG. 52. — Scenes in Italy. (See Project III. Page 149.)

Southeastern Europe. Thatched cottage with appropriate surroundings.

Germany. Castle on Rhine in concrete and stone, vineyards shown on hillsides.

Italy. Sandmap on which were shown St. Gothard's tunnel through the Alps, Leaning Tower, Mt. Vesuvius, orange and lemon groves, a macaroni factory. (See Figure 52.)

Correlation. — This problem was based upon geography. The search for information concerning the different projects led to individual reading with a definite purpose. Measurements of various sorts required an application of knowledge of number. In clay modeling, in proportions of houses, etc., in selection of colors, and in general arrangement the child's artistic sense was given exercise.

PROJECT NO. IV

Subject :

Geography in Sixth Grade.

Field — Europe.

Text — Tarr and McMurry, Book II, pp. 257-340.

Problem of Project. — To use the preparation of an illustrated booklet as a motive for the study of geography.

Problem of Pupils. — To coöperate with each other in collecting descriptive and illustrative material upon the various countries of Europe and to write upon one of the countries.

Conditions. — Class of forty pupils under very strong teacher.

Form of Illustration. — Individual booklets by each pupil. Various topics illustrated upon sand-table and by construction.

Time. — Entire period for subject, six months; for each country, one to three weeks according to its importance. Two weeks after the last class dis-

cussion of the topic was allowed for completion of booklets. Time for sandtable—class hour for one or two lesson periods for a small group of pupils. Individual illustrations, as Irish jaunting car, were made out of class hours or at home.

Organization of Class. — At the beginning of the study of Europe, each pupil was assigned one coun-

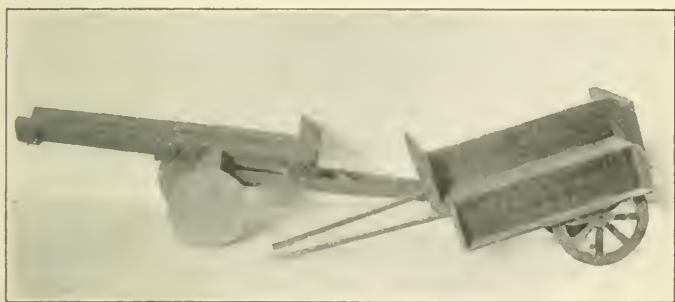


FIG. 53. — Swedish Haycart and Irish Jaunting Car. Sixth Grade.
Columbia, Mo.

try, each country being assigned to more than one pupil.

As opportunity offered individual pupils were encouraged to construct illustrative models of features discussed in class; for instance, types of vehicles in different countries. In some cases, as different countries were studied, a sandtable illustration was made by a selected group.

Organization of Subject-matter. — After the assignment of topics for booklets, the study followed the order of the text. The text was supplemented by

numerous books in the school library and by contributions from the class. All topics were studied alike by all pupils.

Pupils were encouraged to pass on any useful material to others who were collecting material upon the topic. Selection was made from the list of assigned readings, and such selections as "A Dog of Flanders" and "A Leak in the Dike" were read when appropriate to the study of geography.

Method in Detail. — In carrying out the above outline each pupil was made to feel responsibility for his particular topic to the fullest extent. Those assigned to the less interesting topics were helped to find the interesting features that careful study was sure to develop.

In some cases where several were assigned to one country, each one wrote upon a special phase of the topic; as for example, "The Art of Italy," "Dairying in Holland." Each pupil designed a cover for the booklet. These were for the most part made of neutral toned paper with well lettered, well placed titles for their only decoration. Each booklet contained several chapters or short sketches on various phases of the topic. These chapters were submitted to the teacher for criticism in most cases before being bound into the book.

Correlation. — The basis of this study was geography. The writing of the subject-matter of the booklets supplied motive and material for work in

English. The choice of appropriate material added interest to the reading while it enriched the geography. The selection of illustrations, the making of sketches, and the designing of the cover gave opportunity for applying the principles of design given in the regular art lessons.

Other Projects Based upon the Study of Europe. — One class which worked in a very small room could not make use of a sandtable. In this class emphasis was placed upon booklet and poster making and such forms of construction as space permitted. Figure No. 54 shows a few of the dolls dressed in peasant costumes by the girls. Figure No. 53 shows some typical European vehicles made by boys in this and other classes. These projects were chiefly individual contributions on which the work was done out of class time for the most part.

One class made a sandtable picture of Holland, on a small square table. They first measured the map in the book and compared it with the size of the table to get the proper ratio of proportion. The table proved to be fifteen and one-half times the size of the map. The use of the fraction correlated well with their study of arithmetic. Their interest in Holland's dikes made them over-anxious to build before they had sufficient data. After getting it all in they found it necessary to take out part of the dike from those parts of the coast which need no protection, a mistake which impressed the truth



FIG. 54. — Dolls in Typical Costumes. Sixth Grade. Columbia, Mo. (See Project IV. Page 153.)

more deeply than if it had not been made. A boy came in triumph one morning with a herd of cattle — small pictures which he had cut out and mounted for the dairy. He was somewhat abashed when his attention was called to the fact that he had pictures of Jersey cows, but he quickly rallied, took his



FIG. 55. — Holland's Dikes. Sixth Grade, Columbia, Mo.

brush and some ink, and soon transformed the Jerseys into Holland's favorite Holsteins. These incidents are a few of many which occurred in connection with every piece of work and in one way or another helped to impress items of interest.

PROJECT NO. V

Subject:

History in Sixth Grade.

Topic — Review of Early United States History.

Text — Gordy, pp. 1-122.

Problem of Project. — To test the value of poster making as a means of review.

Problem for Pupils. — To select and illustrate the important events of a given period.

Conditions. — Class of thirty pupils under a resourceful teacher.

Type of Illustration. — Poster sketches.

Time. — One study period of thirty minutes for actual work. Problem outlined in one lesson. Posters presented for discussion at next recitation period.

Organization of Class. — Class of thirty pupils divided into three groups each under a captain who assigned topics. Groups had opportunity to discuss division of subject into topics.

Organization of Subject Matter. — Subject divided into three topics, exploration, settlement, and colonization. Each topic subdivided by groups into subjects for individual posters.

Method in Detail. — Each member of a group made sketches for the topics assigned to him. At the recitation period these were hung in order and the story they told related by different members of the group.

Correlation. — This problem was based upon history. Making the sketches called into action the knowledge of art principles gained in drawing lessons. It required individual reading for information.

PROJECT NO. VI

Subject :

History in Fifth Grade.

Topic — Lewis and Clark Expedition.

Text — Our Country's Story, p. 176, and supplementary readings.

Problem of Project. — To add interest to the study of history and discover to what extent a sandtable



FIG. 56. — Lewis and Clark Expedition.

This was the first illustrative problem undertaken by this class, and no sandtable had yet been provided. A boy offered to bring a box from home. It proved to be a small mortar box. It was not beautiful, but the picture made in it by the children made up for anything the box lacked. (See Project VI. Page 157.)

problem could be used to correlate various phases of subject matter.

Problem for Pupils. — To represent on the sandtable the route of the Lewis and Clark Expedition.

Conditions. — Class of thirty pupils under an experienced teacher.

Form of Illustration. — Sandtable illustration.

Time. — Three and four pupils working at one time in odd minutes. Total time about one-half hour daily for a period of eight days.

Organization of Class. — Class divided into four groups, each group having a definite part of the subject to illustrate. Different members of the groups worked at the table for short periods.

Organization of Subject Matter. — Topic divided into four parts, each part assigned to one group, as follows: physical features, route from St. Louis to Council Bluffs, route from Council Bluffs to mountains, route across mountains to coast. Each pupil wrote a description of the part assigned to his group.

Method in Detail. — After sufficient reading to become familiar with the main points of the story and a general discussion as to possible methods, specific topics were assigned to small groups. These topics included relative proportions and distances on the map, modeling the physical features in relief, making of boats, cabins, huts, Indian camp, etc., modeling human figures, horses, and wild animals, planting grass seed for prairies, representing different forms of vegetation in different sections, setting flags and sign-posts to trace the route of the expedition.

The completed illustration showed the principal events of the journey and the general appearance of the country from the Mississippi to the coast.

Correlation. — This experiment was based upon history. Giving the proper background to the story required almost equal emphasis on the geographical features of the country traversed, with some study of the habits of the Indian tribes encountered. The necessity for accurate information required extensive reading. Telling the story orally and in writing gave practice in English. Reducing the measurements of the map to the proper proportions for the sandtable gave practice in arithmetic. Growing grass for the prairies and representing trees on the western slope directed attention to the different sorts of vegetation and the reason for the difference.

PROJECT NO. VII

Subject :

History in Fifth Grade.

Topic — Colonial Life.

Text — Our Country's Story, pp. 83-88.

Problem of Project. — To give a sense of reality to printed descriptions through the use of representative constructions.

Problem for Pupils. — To build and furnish a Colonial kitchen.

Conditions. — Class of thirty pupils under young teacher with one year's experience.

Type of Illustration. — Construction.

Time. — Study hour and odd minutes of small groups for period of one week.



FIG. 57. — Colonial Home Life. (See Project VII. Page 159.)



FIG. 58. — Another Colonial House. (See Project VII. Page 159.)

Organization of Class. — After a general discussion of plans for the house and its furnishing, the pupils chose parts which they wished to do.

Organization of Subject Matter. — Construction was planned to show the house, fireplace and cooking utensils, furniture and clothing.

Detail of Method. — The house was made from a box by five boys. Various cooking utensils were whittled from wood according to descriptions found in the books read. Dolls were dressed in Colonial costumes by the girls. Books and pictures were studied for suggestions and effects.

Correlation. — This problem was based upon history. It involved careful reading and some measurement, but other than these incidental connections no emphasis was placed upon related subjects.

PROJECT NO. VIII

Subject :

Geography in Fifth Grade.

Topic — Panama Canal.

Texts — Tarr and McMurry, Book II, p. 236.

Carpenter's South America.

Problem of Project. — To use a concrete illustration in explaining the operation of canal locks.

Problem for Pupils. — To build the Panama Canal in miniature and operate the locks.

Conditions. — Class of thirty pupils under strong teacher.

Form of Illustration. — Construction in cement, and booklets.

Time. — Work done by six boys working during half-hour class period during a period of three weeks.



FIG. 59. — Panama Canal and Locks. The Locks at the Other End of the Table were Made to Operate. (See Project VIII. Page 163.)

A mistake caused a serious discouragement and the work rested for about one week.

Organization of Class. — Two groups of three boys worked in turns during the regular class period upon the construction on the sandtable. Individual

pupils contributed minor features, as model of steam shovel. Entire class prepared booklets describing the Canal.

Organization of Subject Matter. — Study of the canal used as an introduction to South America. Entire class read text and as many supplementary books in addition to Carpenter as they could find. General class discussions followed the reading.

Method in Detail. — After studying the general facts concerning the canal, the construction of locks, and the use of concrete, the canal was constructed by the boys.

The construction involved much planning and careful measurement. When they thought they had completed their work, water was poured into the lake but it was immediately absorbed by the too-porous surface of the cement. This required a resurfacing of the lake with a harder mixture which proved satisfactory. When water was poured in a second time, the lake held, but the gates proved faulty, and a new plan was necessary. About a week passed before the boys recovered from this second disappointment, and revived their courage sufficiently to try some new suggestions. Success finally crowned their efforts and on visitors' day the committee in charge operated the locks and took the two-inch boat up and down, not once but many times, while they proudly explained the principles of lock-building to their admiring parents.

Correlation. — This problem was based upon geography. The building of the model and the writing of the description furnished motive for reading. The building of the model involved a great deal of careful measurement and very practical arithmetic. The writing of the description furnished subject matter for language work. The making of the cover for the booklet, as well as the selection and arrangement of the illustrations within, involved principles of design.

Other Canal Projects. — In addition to the problem described as Project VIII, other classes have studied the Panama Canal by similar methods with varying details, several of them under the direction of the same teacher. Of this series the first, shown in Figure 60, made no attempt at perfect locks, the general principle upon which they are constructed being all that was stressed. The sandtable project, however, made a deep impression upon the oncoming class of fourth-grade boys who, when their turn came the next year, were anxious to build better than their predecessors. Their success is described in Project No. VIII.

The last of the series recently completed is built with the hope that it may bear transportation to the state fair. In this instance paraffin has been used to make the locks water-tight. One tier of locks is fitted with gates which open in the center and swing inward as in the real canal. This form of

lock being hard to manage in the material used, another tier of locks is fitted with a sliding gate such as is used in Western irrigating systems, and made water-tight. Through this tier the boats



FIG. 60. — A First Attempt at Lock building. (See Other Canal Projects, Page 164.)

are raised and lowered from ocean to lake and back again.

In these canal projects one chief weakness noticeable is the disproportionate height of mountains in relation to width of plains. This comes about, no doubt, through the necessity for showing individual

features quite out of proportion in order to make them sufficiently realistic. This weakness tends to disappear as the work progresses. If we search our own mental pictures, however, we will doubtless find them made up of exaggerated details. For example, California in 1849 is to most people a mining camp only. Though this may seem at first an argument against illustrative methods, we must admit that such an exaggerated detail is to be chosen rather than the idea that Maine is pink and that cities are black dots.

PROJECT NO. IX

Subject. A Lumber Camp.

(See Figure 61.)

Problem of Project. — To test the value of the sandtable as an aid to composition work.

Problem of Pupils. — To study the characteristics of a lumber camp in Maine, build a miniature camp upon the sandtable, and write a description of a lumber camp.

Conditions. — Class of thirty-five sixth-grade pupils.

Organization of Class. — All members of the class contributed to the building of the model camp. The project as a whole was organized by teacher and pupils together and parts assigned to individuals and small groups.

Method in Detail. — After the selection of the topic, the class read Carpenter's description of a



FIG. 61. — A Lumber Camp. (See Project IX. Page 166.)

lumber camp and studied various pictures. The building of the model involved a review of the geography of the region near Bangor, Maine, where the camp was to be located, a study of the various trees to be found in the region, the method of building the cabin, the sort of tools and machinery needed by lumbermen, and their dress, habits, and character. The completed table showed a cabin placed in a forest containing several varieties of timber, a flume, an ice road, and a sawmill.

In the composition work which followed, each pupil imagined himself to be visiting at the camp for a week. He kept a diary of the events of the days spent there, describing the operations of the lumbermen. He wrote one letter to some one at home describing his impressions. This project was among the first attempts by this class in the use of illustrative methods, and the results were highly satisfactory to both teacher and pupils.

Another Lumber Camp. — Figure 62 shows a miniature lumber camp arranged by a fifth-grade class as a side light on a topic in geography. In this instance the topic was assigned by the teacher to a group of boys who prepared their illustration somewhat crudely. After the class had examined the work another group asked permission to make another illustration, as they felt sure they could make a sawmill that would work. The illustration shows the work of the second group. One boy brought a



FIG. 62. — A Lumber Camp and Sawmill. (See Another Lumber Camp. Page 168.)

toy engine operated by alcohol. From a piece of tin, a spool, a string, a screw, and a block of wood, they constructed a circular saw which, when driven by the small steam engine, would saw cardboard and thin pieces of wood. Their pride in their success was most stimulating, both to themselves and to others.

PROJECT NO. X

Subject. The Rotation and Revolution of the Earth.

(See Figure 63.)

Problem of Project. — To find a way of making this troublesome idea clearer to a group of sixth-grade pupils in the rural school.

Problem of Pupils. — To make a simple piece of apparatus which would show the two motions of the earth.

Conditions. — A one-room rural school without wall maps, globe, or other common equipment, and without funds with which to purchase materials.

Detail of Method. — On finding the class troubled by the problem in question, it was suggested that they find a long stick and fasten one end loosely to a heavy block of wood so that it could be revolved around the fastening. At the outer end of the stick they were to set a wire bent at an angle of $23\frac{1}{2}$ degrees to represent the axis of the earth. At the inner end of the stick they were to fasten a small candle to rep-

resent the sun. It was agreed to use an apple for the earth.

No further directions were given. Several boys agreed to find materials and have the apparatus ready when the supervisor came again. They found a scrap of 4×4 lumber and a piece of yardstick which they arranged as directed. The candle was supported by a small nail driven through from the lower side of the stick beside the nail which fastened the stick to the block. A very crooked piece of bailing wire, only partially straightened, did duty for the axis. On the next visit of the supervisor an apple was impaled on the wire, the candle lighted, and the apple revolved about the candle, or better the earth revolved about the sun, with the wire axis pointed steadily to the north. At first, to keep the axis in proper position, a string was tied to the north pole and fastened to a nail on the north wall which did duty for the North Star, as a suggestion of the mysterious force which pulls the north pole always in the same direction. The idea established, the string became superfluous and was discarded. The "earth" was placed in various relations to the "sun" and the seasons discussed. The delighted and enlightened expression on the faces of the children as they said, "Oh, now I see how it is," seemed ample justification of the method.

The apparatus was to be given to the supervisor when they were through with it, but soon afterwards

the school had a night visit from tramps who used it for kindling. The boys offered to make another and better one for the supervisor, which they did, its photograph being shown in Figure 63. The first model was very rough and crude, but the second was made from better material and put together more

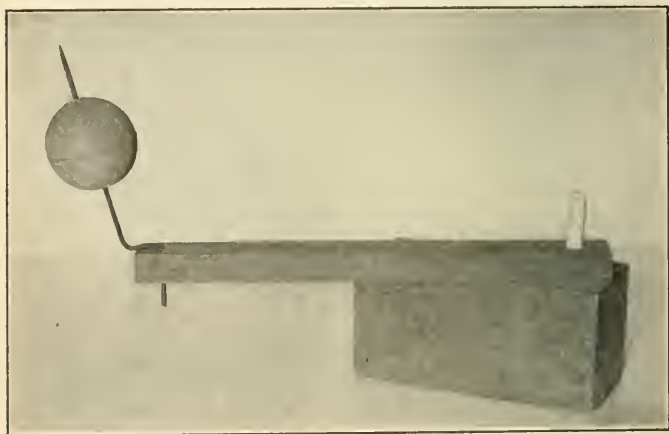


FIG. 63. — Apparatus Showing Motions of the Earth. Made by boys of Carlisle Rural School, Boone County, Missouri. (See p. 170.)

accurately. The wire was straight and bent to better angles. A hole was bored part way through the long stick so that the candle could be set directly over the nail upon which the stick revolved, thus putting the "sun" in the exact center instead of a little to one side. Instead of an apple, a rubber ball was purchased and the continents outlined upon it with ink.

These improvements in the second rendering may

be counted as evidence of the truth of the statement above (sandtable criticism) that the crudity of free expression does not establish low ideals of workmanship. This and many similar instances have convinced the author that normal children want to "do better the next time," when the work in hand is on the level of their appreciation and is of interest to them.

PROJECT NO. XI

Subject. Courtship of Miles Standish.

(See Figure 64.)

Problem of Project. — To stimulate an emotional appreciation of the poem through free expression in picture-making.

Problem of Pupils. — To express their ideas of various situations in the poem by means of pictures.

Conditions. — A class of sixth-grade pupils working in the room with a fifth grade under a resourceful teacher.

Detail of Method. — After reading a part of the poem and discussing a particular situation and the probable feeling of the characters, each member of the class tried to express his idea in a free-hand sketch. After the whole poem had been studied the pupils were asked to select passages which they liked and illustrate them. A few specimens of the results are shown in the accompanying illustration. These sketches were not made as a part of the drawing lesson



FIG. 64. — Miles Standish.

and some members of the class had never tried to draw before. In many instances the work was very crude in technique, but nearly every one expressed well the downcast attitude of John Alden on his unwilling errand, the first glimpse of the Indians by the army, and other striking scenes. The act of making the picture deepened the impressions gained through the reading and intensified the emotional response through the necessity, for the time being, of taking on the personality of the character "and trying to feel as he felt."

PROJECT NO. XII

Subject. Nature Study Books on Trees.

Problem of Project. — To test the effect of throwing pupils wholly upon their own responsibility in composition work.

Problem of Pupils. — To preserve in attractive form the data collected in a study of trees and complete the booklet without special criticism from the teacher.

Method in Detail. — The plan for these *Tree Booklets* had been outlined as the crowning effort of the year, when it was decided to test the power of the pupils to judge their own work and bring it to a high standard. The plan included free-hand sketches of various twigs and buds, a sketch of the tree, a description of its habits of growth and its usefulness. An appropriate cover was to be designed under the

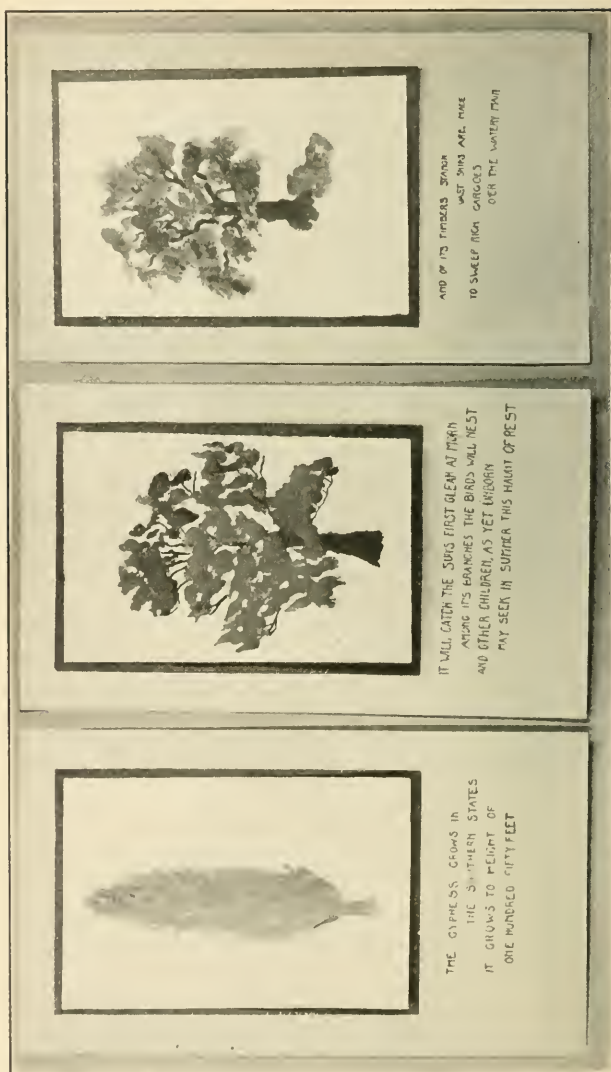


FIG. 65. — Tree Studies in Water Color.

guidance of the drawing teacher. Enthusiasm was keen to make these books exceptionally fine. Usually the teacher inspected a rough draft of the written work before it was copied on the final paper. In this case it was agreed that the pupils should complete the book, even to the final tying of the leaves into the cover, before submitting it for the teacher's approval. They were to be free to ask advice whenever they were in doubt, to consult the dictionary for doubtful spellings, and in other ways to behave as do people outside of school when they have an important piece of work on hand. They were to think first and be sure of themselves, instead of depending on someone to tell them what to say.

Results. — The results were highly satisfactory. The books were most creditable both inside and out. In the composition work nearly one-third had no mistakes in spelling or in the punctuation and grammatical forms for which the children, in consideration of their training in English, could be held accountable.

PROJECT NO. XIII

Subject. The Evolution of Methods of Travel.

(See Figures 66-80.)

Problem of Project. — To give to sixth-grade pupils a general idea of the steps in the development of methods of travel by land and water.

Problem of Pupils. — To find out the particulars of some one method of travel, make a model of the

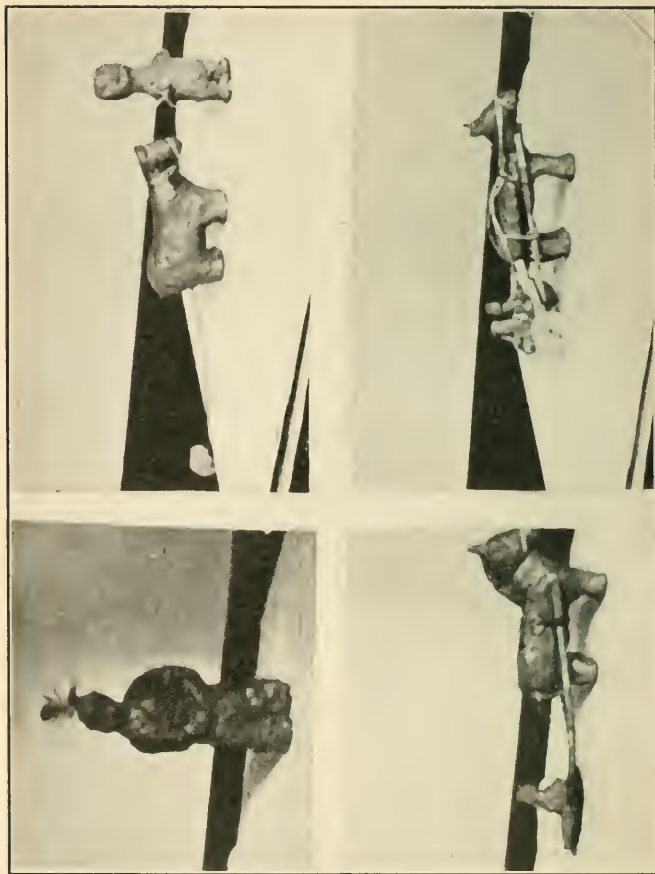


FIG. 66. — Transportation by Land. 1. Carrying the Burden. 2. Single Drag. 3. Double Drag or Sled. 4. Cart.



FIG. 67. — A Prairie Schooner.

vehicle, and explain its use to the other members of the class.

Conditions. — A class of thirty-five pupils under a strong teacher.

Organization of Class. — Class divided into two divisions, one to study travel by land; the other, travel by water. Each division subdivided into



FIG. 68. — Travel by Steam.



FIG. 69. — An Electric Car.



FIG. 70. — An Automobile.



FIG. 71. — An Airship.

small groups of two or three pupils to whom was assigned some one phase of the subject.

Detail of Method.

— After a general discussion of the subject, the class was requested to find out as many interesting items as possible, to contribute to a second discussion a day or two later. After the second discussion it was possible to make a list of projects and apportion them to the several small groups for individual study. Then began a vigorous searching of all books which would give further information on the topics assigned. In the words of the

teacher, "They kept the path to the library hot."

As soon as sufficient data were secured by a group, work was begun upon the model. This involved



FIG. 72. — On a Log. On a Hollow Log.

planning what to make and how to make it, what material to use and where to get it. In many instances the data secured proved insufficient and another trip to the library was demanded and more



FIG. 73 — Canoe and Rowboat.

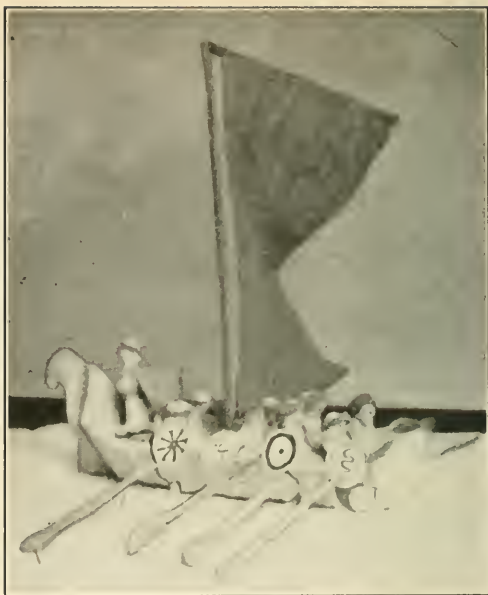


FIG. 74. — A Greek Galley.



FIG. 75. — A Sailboat.

careful reading followed. In other instances the first attempt at construction failed to meet the ideals of the makers and they tried again before they were willing to exhibit their production to the class.



FIG. 76. — A Stern-wheel and Horse-power.

It is impossible in this brief description to do more than indicate the scope of the problem. The accompanying illustrations, Figs. 66 to 80 inclusive, are made from photographs of the results as the author saw them. The pride of the children in their finished work was equaled only by the enthusiasm with which they had worked and the joy with which they an-

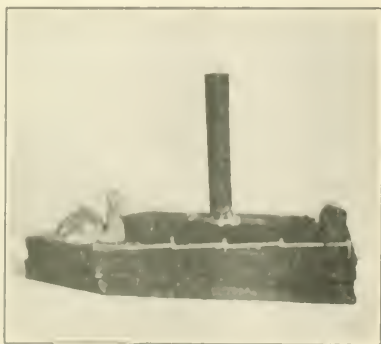


FIG. 77. — River Steamboat.

anticipated the next "*problem.*" This attitude of mind would have been worth the effort even had the information gained been less valuable and the development in resourcefulness less fruitful.

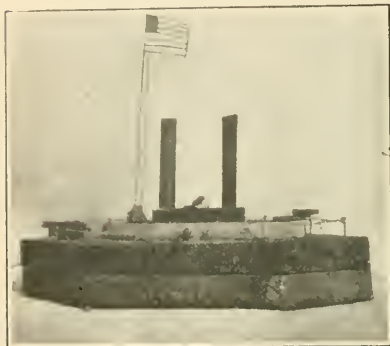


FIG. 78. — Battleship.

A project of this sort encourages independent study and helps the pupil not only to rely upon himself but to make sure of his information.

Each group is anxious to make a good showing before the class. "The feeling of the audience" is strong in such instances, in contrast to the feeling aroused by the ordinary quiz recitation when the pupil is conscious that pupils as well as teacher know all he knows and perhaps more. Under such circumstances he cannot speak with the same enthusiasm he feels when he is



FIG. 79. — Ocean Liner.

imparting interesting information to an eager audience. Such projects also apply and test the pupil's knowledge in other fields, as, measurement, art values, use of clear, well-chosen English in explanation, etc.



FIG. 80. — Motor Boat.

Suggested topics for similar treatment :

Evolution of methods of measuring time.

Evolution of methods of lighting.

Evolution of methods of writing.

Evolution of methods of cooking.

Evolution of harvesting machines.

Evolution of various woodworking tools.

Evolution of various modern inventions.

PROJECT NO. XIV

Subject. A Study of Bridge Building.

(See Figures 81-86.)

Problem of Project. — To open the eyes of the children that they may see deeper than the surface of some of our everyday conveniences, and to awaken an interest in industrial problems.

Problem of Pupils. — To construct a model of some one type of bridge and study its value and use.

Conditions. — Problem under the direction of the



FIG. 81. — Monkey Bridge — Paper Cutting by First Grade. Beaver Dam — Second Grade. Corduroy Road and Bridge — Third grade. Others — Sixth Grade.

principal of a building who taught the seventh grade and assigned parts to other grades.

Organization of Classes.

First grade — Paper cutting lessons on monkey bridge and grapevine bridge.

Second grade — Study of the beaver and building of a beaver dam on the sandtable.

Third grade — Bridge from fallen trees, with a study of corduroy roads.

Fourth grade — Single span wooden bridge.

Fifth grade took no part, being engaged upon a Panama Canal project.

Sixth grade — Covered bridge and cement bridge.

Seventh grade — Drawbridge, jack-knife bridge, suspension bridges of several types.

In the upper grades projects were apportioned to groups of three boys each, the study being undertaken as distinctively a boys' problem.

Method in Detail. — In the upper grades the subject was discussed as an industry in which some of the boys might some day be engaged, which gave a prevocational flavor to the work. Connection was made with other subjects where opportunity offered, — for example, the suspension bridge in the mountains of China, shown in the illustration.

Each group made a study of its particular bridge and made plans for the construction of a model. The seventh-grade boys worked out their models in the



FIG. 82. — Bridges of Various Types. Seventh Grade. Columbia. Mo.

manual arts shop, under the direction of the instructor. The other models were made in the regular classrooms. In each room the projects were made a subject of class study. The study developed much material suitable for composition work, but as it was undertaken near the close of the year, time would not permit an exhaustive use of its possibilities. When the projects were complete they were assembled on three sandtables in the lower hall. The accompanying illustrations are taken from photographs of these sandtables.

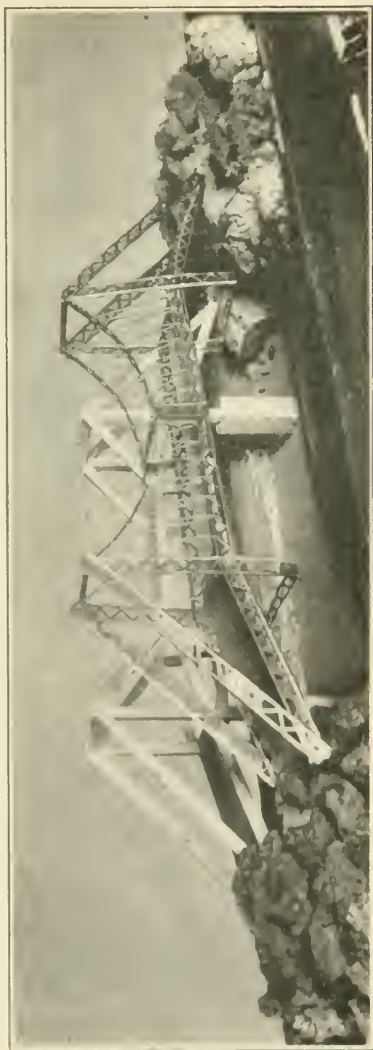


FIG. 83. — Suspension Bridges. Seventh Grade Boys. Columbia, Mo.

Other Bridge Problems. — A study of bridges was made in certain other schools, some of the results of which are shown in the accompanying illustrations.

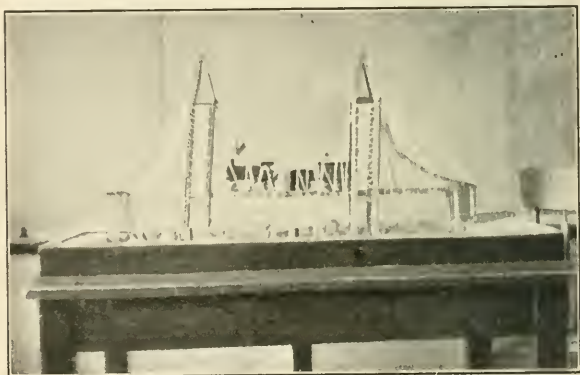


FIG. 84. — Suspension Bridge. Sixth Grade, Humboldt School, St. Joseph, Mo.

Full details are not available as to the organization of these projects, but they were made a part of class work to some extent. In addition clubs were organ-



FIG. 85. — Block Signal, Swing Bridge, and Drawbridge. B. Fifth Grade, McKinley School, St. Joseph, Mo. (See Project 14. Page 185.)

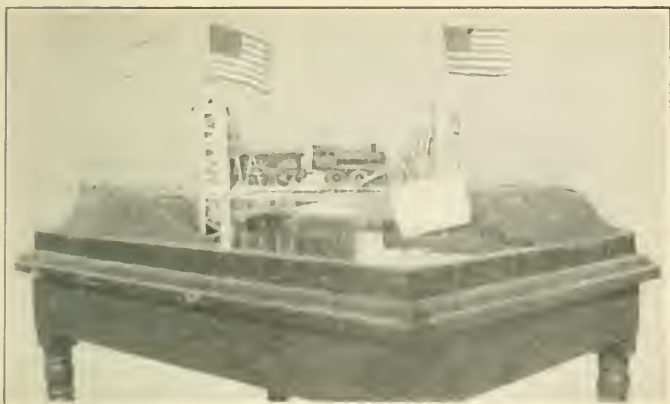


FIG. 86. — Suspension Bridge. Sixth Grade, Garfield School. St. Joseph, Mo.

ized among boys having a certain sort of building toys and a high degree of interest generated in the mechanical possibilities of these toys. The pictures speak for themselves and need no comment.

PROJECT NO. XV

Subject. A Coal Mine.

(See Figure 87.)

Problem of Project. — To test the power of concrete expression, to awaken interest, and arouse energy.

Problem of Pupils. — To build upon the sandtable a miniature coal mine, in connection with a study of industries in geography.

Conditions. — A class of twenty fifth-grade pupils working with a sixth-grade class under a strong

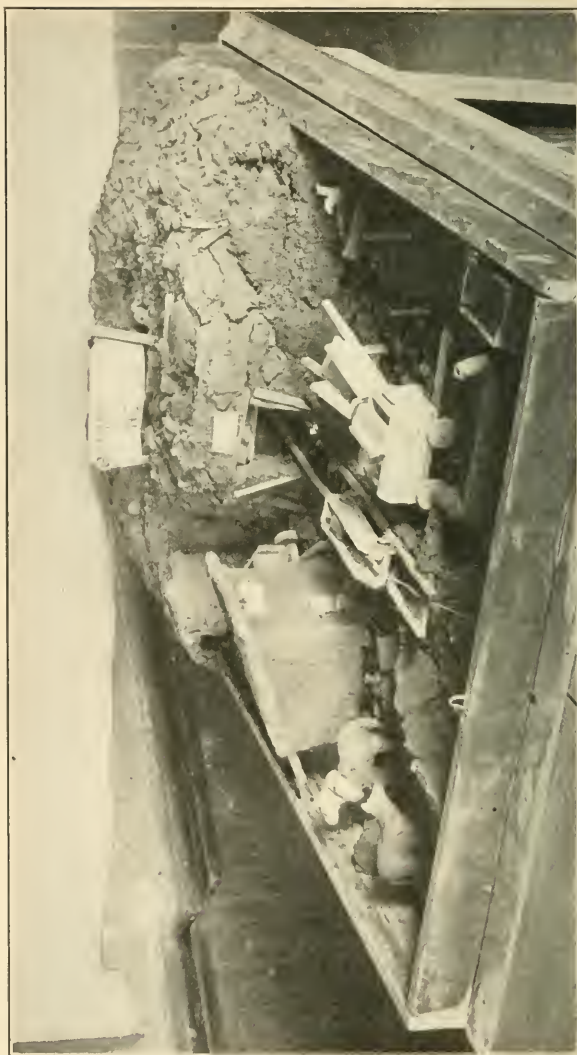


FIG. 87. — A Coal Mine. Fifth Grade, Columbia, Mo. (See Project 15. Page 191.)

teacher. This was the first attempt by this class at work of this sort. No materials were provided and the table used was a makeshift.

Method in Detail. — After a discussion of the problem and plans for its solution, the boys brought in some yellow clay from a corner of the school lot, there being no sand available. Interest waxed strong, and the bad boy who was a frequent truant and an unwilling worker when in school, became the leader in the building process. He not only worked when others worked, but stayed after school and only left reluctantly when the teacher was ready to close the doors. He made a journey ten miles into the country on Saturday to get some definite details to “show you how it ought to be.”

The finished model as shown in Figure 87 represented a drift mine properly ventilated with the air shaft shown at the left above the shed. By means of a string attached to the two ends of the coal car, when full of coal it could be rolled out of the mine and made to dump its cargo and return for more. By an ingenious placing of a hole in the top behind the sign, it was possible for the operator to refill the car while the visitor's attention was distracted by other details. The car would then roll out and deposit a second load, and leave the visitor wondering how many small miners were really at work inside. To all of us, big and little, the creations of our hands are precious, and the miner with the lamp on his cap

does not appear in the illustration because the photograph was taken on Saturday when the miner was packed away in cotton for safe-keeping. He was only a clay miner, but he was very real and precious to the children.

PROJECT NO. XVI

Subject. A Circus Parade.

(See Figure 88.)

Problem of Project. — To use the interest in animals and the circus as a motive for art, geography, and composition.

Problem of Pupils. — To find out interesting facts concerning animals; to draw and make in wood one or more animals.

Conditions. — One of the regular projects of a teachers' training class in handwork, also worked out by several groups of children. This report includes items common to all.

Organization of Class. — The subject of the circus animals was discussed by the class as a whole. Animals to be made were selected and assigned to individuals. Information concerning the animal assigned was collected by the student and preserved in the form of a booklet.

Method in Detail. — In the discussion, attention was directed to the habits of the animal in question, its habitat, food, size, color, value to man and nature of the value. The various members of the class

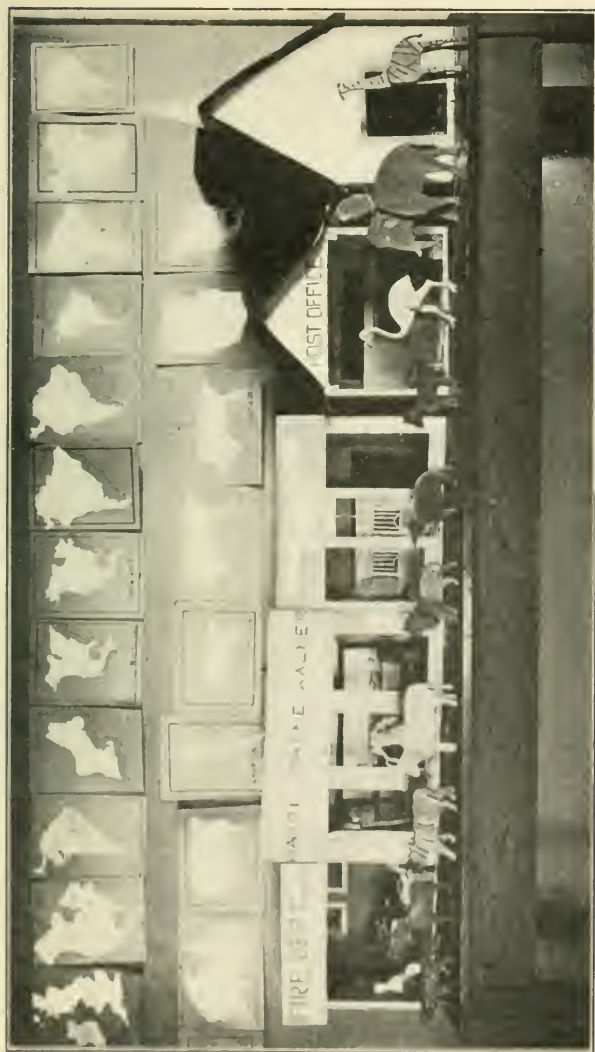


FIG. 88. — Dough Maps and a Circus Parade. Training Class, Missouri University.

consulted all available sources of information for the facts desired, they brought in all available pictures and began sketching the animal assigned. When a fairly good sketch was secured, a pattern was made by drawing a profile outline of the animal into a rectangle proportioned to suit the extreme length and height of the average of the species, using the ratio of one inch to a foot of the actual measurements. (The pattern sketch is not a perspective sketch and all four feet of the animal must touch the base line, otherwise the animal will not stand when completed.) From the pattern sketch, section patterns were made, one for head, body, and tail, without legs; one for each side with body and legs but without head or tail. The three patterns were then drawn upon thin wood and sawed out with a coping saw. (It is important in placing the patterns on the wood to see that all frail parts, as legs and tails, are laid lengthwise of the grain of the wood.) After the parts were sawed out, they were nailed together and the animal colored with crayon or water color. In the making of the books which accompanied this work each student was left free to write about one or more animals as desired. Some books gave extended details concerning one animal. Some students exchanged data and wrote about several animals under an appropriate title.

Correlation. — This project makes a strong appeal to boys in about the fifth or sixth grade. This is

an important item, since so much of the usual school work is somewhat girlish in character and fails to attract boys of this age. The project may be closely related to geography by emphasis upon the habitat of the animal. The book may include color maps on printed or hectographed outlines, showing the regions in which the animal is to be found. The project may be closely correlated with arithmetic by studying the commercial value of the animal and its products. The information so gained may be made a part of the booklet. Gaining the needed information gives a strong motive to reading and may be used by the teacher as an opportunity for teaching the pupil how to set about an independent investigation and how to arrange the data collected. This involves both reading and composition. The art element is pronounced in this project. In addition to the sketching of the outline, making the patterns involves a careful observation of anatomy in order to get good shoulder and rump lines on the sides. The coloring of the animal is also a good art problem.

In the sawing out and putting together of parts, this project closely approaches the technical field, and with or without the correlated bookwork, forms a very suitable project for beginning woodwork. Used with the accompanying bookwork and as the motive for such work, the project belongs in the class of work described earlier as representative problems,

since, when the project is used in this way, the current of thought flows from the handwork to the related subject matter. The project may, however, be used in a purely illustrative sense when it will serve as a means of adding interest to regular subject matter, — for example, at the time when the class is studying the animals of North America in geography. The project may also be used in modified form for younger pupils by making the animals of cardboard instead of wood.

PROJECT NO. XVII

Subject. The Planing Mill.

Problem of Project. — To show whether the attempt to construct would help develop clear ideas about complicated machines, thus justifying the process as a method of study for beginners.

Problem of Student. — To construct a rough model of a machine which would show its general proportions and chief characteristics.

Conditions. — A group of four students in a teachers' training class, composed of three young women who knew nothing of the machines used in a planing mill, and one man, a graduate student in Manual Arts. The attitude of the man at the beginning was highly skeptical. Being acquainted with the intricacies of the machines he knew that they could not be adequately represented by rough models and he was troubled about the details. The attitude of the

young women was that of curiosity and interest in a new idea, accompanied by bewilderment over its complexity.

Organization. — The members were to work in pairs, each pair to make models of two machines. The machines selected were planer, circular saw, band saw, and sanding machine.

Detail of Method. — The group was sent to visit the manual training shop to inspect all machines and get data for making models of the ones assigned.

On appearance in the classroom afterwards there was still evident bewilderment as to a method of attack. All assented to the remark of one student, "It seemed plain enough while we were in the shop and they were explaining the machines to us." After permitting some random attempts the instructor suggested a second visit to the shop which was eagerly agreed upon. On the return to the classroom it was evident that they had really *seen* on the second trip, and the building of the models began in earnest. Only the main features of each were attempted. The young women had considerable difficulty in adjusting belts and keeping the proper relationship between wheels and shafts. The man had trouble in trying to forget some of the things he knew and to put himself on the level of the untaught child. He was inclined to try to show many minor details unimportant in the project in hand, though useful in the real machine.

Results. — When the project was completed the students were asked to express themselves freely as to their gain. The three young women enthusiastically agreed that the planing mill was now a familiar friend and not a mystery; that they had gained a general idea which, though incomplete in detail, was truthful and which gave the term “planing mill” a new and interesting meaning to them. The man, though not having added to his personal knowledge of the machines in question, admitted that the method was helpful to the beginner who knew nothing of machines and that it was likely to engender a desire for further study.

This project, though not the work of children as are all others here outlined, is offered as evidence that the process of making aids much in the study of many problems. The group felt satisfied at the end of the first visit that they had learned much about wood-working machines. The attempt to give tangible expression to their ideas proved to them that they had not observed as carefully as they had supposed.

The author wishes to raise the question whether or not much of our teaching falls short of its purpose and fails to make a lasting impression upon the children because we stop too early and leave the children at the point reached by this group at the end of the first visit. Had nothing more been done in this case, the impressions would soon have faded into vague nothingness.

CHAPTER VI

REPORT OF TEACHERS, WITH SUMMARY ¹

THE following questions were put to the teachers who assisted in working out the projects. Ten teachers contributed to the work.

I

Give length of study and recitation periods in history and geography.

	No. MIN. DAILY							
	90	60	50	40	30	25	20	15
<i>History</i>								
study		1			2	5	1	1
recitation					4	5	1	
total study and recitation	1	4	5					
<i>Geography</i>								
study		1			2	5	2	
recitation		1		1	3	5		
total study and recitation		5	5					

Average daily period for each subject 58 minutes.

¹This report is taken, without modification, from the thesis where it first appeared.

II

Did you use extra time for illustrative work, over and above the total for study and recitation, and how much?

Answers vary from "none at all" to "one hour some weeks, but not every week."

III

Was the extra time taken in school hours or out of school hours? Answer: In school hours — 4; out of school hours — 5; varied — 1.

IV

Did the illustrative work interfere with work in other subjects? Answer: (1) By taking time from them: No — 10. (2) By distracting attention: No — 6; a little — 4.

V

Was the interference justified by the increased interest in the work? Answer: Yes — 10 (with emphasis).

VI

Has illustrative work had a tendency to increase interest? Answer: (1) In the subject, yes — 10; in related reading, yes — 10; in art appreciation, yes — 10; in the interest of patrons, yes — 7; some — 1; not sure — 2.

VII

Has illustrative work helped to hold the interest of pupils otherwise indifferent? Answer: Yes — 7; a few — 2; nearly always — 1.

VIII

Have illustrative methods helped any backward pupils to a clearer understanding of these or other subjects? Answer: Yes — 7; some — 2; not sure — 1.



FIG. 80. — Illustrations by Fourth and Fifth Grade classes working in same room, each too eager to wait. Bunker Hill at one end, showed Boys in Blue standing bravely to their guns, and Redcoats falling as they attempted to scale the hill. Hiawatha by Fourth Grade.

IX

Does the use of booklets increase interest in composition, *i.e.* in having something interesting to say and in saying it well, not merely in making a pretty book? Answer: Yes, decidedly — 3; yes, for most pupils — 1; yes — 5; not sure — 1.

X

Have you noticed any differences between boys and girls in interest in illustrative work? In preference for different forms of work? Answer: Boys prefer building — 5; girls are more careful — 4; girls stick to their work better — 2; girls like posters and books better — 3; not much difference — 5.

The following table shows the percentage of failures in grades five, six, and seven for the last year preceding and the two years following the introduction of illustrative methods.

GRADE	1910-11	1911-12	1912-13
Five	28.7%	12.5%	11.0%
Six	9.7%	8.2%	5.3%
Seven	8.9%	4.5%	2.0%

These figures were based upon general averages for all subjects. The figures for 1912-13 include some conditioned pupils in grades five and six. (See comment on page 208 as to the relative value of these figures.)

Summary. — The problem which forms the basis of this study, taken with its limitations, may be restated thus:



FIG. 90. — Ali Baba and the Forty Thieves. Fourth Grade. Columbia, Mo.

To discover the extent to which handwork may be used in the ordinary schoolroom (by teachers having no technical training) for the purpose of facilitating the study of geography and history, yet without interfering with other required work, or adding greatly to expense.

The results of the experiments seem to justify certain conclusions:

(1) Concerning expense:

The figures here given are for the work of the second year; figures for the first year's work were not available. The first year's expense included lumber for sandtables, which were built by the janitors, and one small bill for thin wood and paper. The total was less than the total for the second year.

Expense, for second year:

Amount spent for equipment	\$42.00
(Including saws, hammers, jars for clay)	
Amount spent for material	<u>11.76</u>
Total expense	\$53.76
Number of pupils enrolled in classes supplied	
with material	1018
Average cost per pupil	\$.05
Cost of material per pupil01

Comment upon these figures is unnecessary.

(2) Concerning time required for illustrative work:

The question of actual time spent upon illustrative work, especially upon coöperative problems such as

sandtable illustrations, is very hard to calculate with great accuracy. This is so for the following reasons :

Pupils must work upon these problems in small groups. In order to accomplish any large project in reasonable time the groups must follow each other in quick succession. To this end the "odd minutes" which individual pupils find at various periods in the day, and which otherwise are frequently worse than wasted, may be used upon illustrative problems to good advantage without affecting the general program in any way.

The teacher may know very positively that the work has not been done wholly during the period and that it has not "stolen time" from another subject, yet she may be quite unable to give definite figures.

The figures here given approximate the truth as nearly as is possible under the conditions of the experiment.

According to the report of the teachers, the time spent upon illustrative work, over and above the regular period devoted to the subject, did not, in any case, exceed one hour per week. Even this excess was for only part of the time. The report states further that, in half the instances, the fraction of an hour so used consisted of time not included in the regular school period.

These conditions reduce the amount of extra time required for the work to so small a figure that it is scarcely worth considering; but, if it is con-

sidered at all, it is, according to the report of the teachers, fully justified by the increased interest of the pupils in their work.

These facts justify the conclusion that illustrative handwork may be used as a method of study and recitation without increasing the amount of time allotted to the subject.

(3) Concerning the value of illustrative methods:

The problem stipulates that the time spent upon illustrative work must be profitably used. The extent to which this was accomplished is indicated in the answers to questions VI, VII, and VIII of the Report of Teachers. The statement concerning failures also has a slight bearing upon this point.

The statements of the teachers show that the work had a tendency to increase interest in the subjects illustrated, in reading for information related to these subjects, and in preparing the work in more artistic form than that used before these methods were introduced.

These statements indicate also, though as yet there are no reliable statistics to prove it, that the teachers are strongly inclined to the belief that illustrative methods help indifferent and backward pupils to greater interest and better understanding than are common under the usual methods. The statement concerning failures, so far as it bears upon this point, upholds the opinion of the teachers. So many other factors enter into the general averages

upon which promotions are based, that very little importance can be attached to these figures as evidence concerning the value of illustrative methods. There is, however, ample evidence of trustworthy nature to warrant the conclusion that illustrative methods are not only possible in the ordinary school-room, but that they are also profitable.



FIG. 91. — Dutch Home Life. Grade 4 A. Franklin, Ind.

(4) Concerning the training of teachers :

The necessity for technical training on the part of the teacher is proportionate to the emphasis to be placed upon technical accuracy in the work to be done.

In illustrative methods, such as herein described, technical training on the part of the teacher is not

essential. This is so for two reasons: First, since the emphasis is placed upon effect, the structures are for the most part of temporary nature and do not require technical accuracy; second, the placing of emphasis upon the value of the work as a means of self-expression, demands that the pupil shall be allowed to find his own way to a very great extent rather than that he shall be expected to follow definite instructions.

These considerations seem to justify the conclusion that technical training for the teacher, though of obvious advantage, is in no degree essential to the successful use of illustrative methods.

(5) Concerning forms of illustration :

During the course of the experiments certain interesting facts developed concerning the various forms of illustration.

Poster making proved to be a most helpful and interesting medium through which the children could show, in a comprehensive way, the main ideas they had gained from their study. The process interested them, and, at the same time, helped to fix the facts more firmly in their minds. Poster making proved to be especially well suited to reviews as a means of gathering the important facts together, in both history and geography. It also brought about a marked improvement in spacing and lettering, which was due rather to the ability of the pupils to see the value of good work in

these particulars than to the urging of the teacher. The posters made these values self-evident.

Illustrated booklets proved to be a strong incentive to good work in composition, both in quantity and quality. In a series of Hero Books, for example, each pupil chose to write about a greater number of heroes than when the ordinary method was used. It was felt that the book must be made worthy of its name. In a set of Tree Studies containing sketches and descriptions of common trees, which were not examined by the teacher until completed, over one-fourth the number were without errors in spelling and punctuation. In these respects, however, special emphasis had been laid upon individual responsibility. The making of the booklets lifted composition to a higher level of permanence and dignity. It made it seem more worth while to the pupils to put energy into their preparation; greater effort was made to have something worth saying, and to say it well. The use of illustrations added still further to the interest of the work.

In sandtable illustrations, the tendency during the first year was toward elaborate representations and a desire to get something which looked well when finished, the novelty of the work appealing to both teachers and pupils. During the second year there was a greater willingness on the part of the teachers to use the sandtable chiefly for very temporary illustration which could be made during

the recitation to illustrate some topic under immediate discussion, and there was also a greater readiness to be satisfied when the points were made clear without adding superfluous details.

On the part of the children, the center of interest moved forward toward constructions of a better type. The temporary and imperfect constructions



FIG. 92. — Boonesborough Stockade. Grade 5B. Franklin, Ind.

used on the sandtable awakened a desire to make representations which were more perfect models.

The very temporary and spontaneous type of sandtable illustration was conceded by the teachers to be of more value than the elaborate representations.

In construction, the children showed a strong tendency to improve upon what had been done before by themselves and by others. Not only was

a sixth-grade boy unsatisfied with the degree of attainment which had satisfied him in the fifth grade, but each attempt at representation had very obvious defects which the next worker felt a desire to correct. During the first year, in making a model of the Panama Canal, the general appearance was all that was aimed at, but in the second year, in two instances, small groups of boys persevered in their efforts until the boats were actually lifted up and down through the locks.

These facts point to the very obvious conclusion that when normal children are allowed to express themselves freely through projects which seem to them worth while, they are anxious to secure the best results of which they are capable. They are able to see and appreciate defects, and are anxious to correct them. They are not satisfied to remain on a low level of attainment, but strive constantly to surpass their own best efforts.

The evident conclusions to be drawn from the foregoing study may be briefly summarized as follows:

- (1) Illustrative methods increase the interest of pupils in their work, and may be used without increasing the time allotted to the subject.

- (2) The inaccuracies incident to the temporary nature of illustrative projects do not tend to encourage carelessness, but when coupled with interesting subject matter tend to awaken a desire to produce better results.

(3) Technical training on the part of the teacher is not essential, though of decided advantage.

(4) Illustrative handwork may be carried on in the ordinary schoolroom at very small expense for equipment and material.

CHAPTER VII

A COMPELLING MOTIVE

AT the foundation of most of our theories of education and discipline lies the old psychological law, that we enter into vigorously and tend to repeat pleasant experiences, and that we avoid as far as possible unpleasant experiences. The emphasis which we place upon the positive or negative side of this proposition makes all the difference between the teacher who believes in making things hard in school to prepare for the stern duties of life and the one who finds life full of joy and beauty, and succeeds in helping her pupils to find much of it.

If we place the chief emphasis upon the negative side we see mistakes and their consequences larger than anything else. We try to keep the children in the straight and narrow path of duty by making it unpleasant for them to walk elsewhere. We pronounce "*duty*" as if it were spelled always in capitals and printed in dull gray. We teach by our actions that duty is always hard and unpleasant, but we conscientiously try to make the consequences of neglect of duty more unpleasant still and imagine this will develop a high moral standard among our

pupils. To our sorrow some of them choose the present pleasures of the downward road unmindful of the future consequences. Small John plays truant and goes fishing, though he knows double the lost time will be made up at recesses and after school at hard work. In spite of our punishments and warnings many wrong things still hold a tremendous power of attraction, and sometimes we sigh and wish it were as easy to do right as it is to do wrong. We need a compelling motive toward right doing which like the music of the Pied Piper will be irresistible.

Since the negative interpretation of the proposition does not attain our aims satisfactorily, it behooves us to study its positive side. If we reverse our emphasis and instead of increasing the unpleasant consequences of evil increase the rewards of right doing, we are likely to find the compelling motive we seek. It sounds well to say virtue is its own reward, but the greatest of teachers bade us be wise as serpents. The powers of evil are ever at work and employ ingenious means to entice young feet out of the straight road. We must be at least as vigorous and resourceful in defeating their efforts. The school must compete, whether it will or no, with the picture show, the swimming pool, the busy street. These things are not necessarily evils in themselves, but the thoughts of them may and will form a screen between the pupil's eyes and the book



FIG. 93. — The Simple Life. After reading John Burroughs. Sixth Grade. Columbia, Mo.

we would have him study, unless we are able to make the attraction of the topic strong enough to overbalance the force of the outside influences.

If we would do this we must first of all study these compelling forces and find out the secret of their attraction. Having found it, we must lay hold of its power and apply it to good ends. The picture show is not bad in itself and its power as an educative force is already being set to work in some of our progressive schools. These progressive schools are also recognizing in the lure of the swimming hole the need for physical activity and development, and are providing accommodations for physical education. Much more might be done than is done by the schools which think themselves too poor to buy equipment, if the means at hand were fully developed. The teacher who does not know how to play will find the study of games and their power a paying investment of time and energy. The street, above all things else, is the place where things are being done. Something is always going on and interesting things happen. If we are wise we will seek here another compelling motive for the educative process. It is not necessary to make stores and shops of our classrooms nor to begin over early a narrow vocational training, but we must make the school a place where things are being done, where something is always going on, and where interesting things happen.

Many teachers object to projects which break into the routine and "interfere with the work," yet often these same projects by their compelling interest make the children work harder and develop faster than they ever do through the routine methods. Ella Flagg Young is quoted as saying, "What our schools need is more intensity and less extensity." Intensity of action is prompted by intensity of feeling. Intensity of feeling is seldom coupled with that which does not touch our lives closely. It, therefore, behooves us to study into the lives of the children and find where their thoughts live and what activities make a compelling appeal. We shall then know where to look for motive power.

If, instead of emphasizing the dire consequences which befall the evildoer, we can make the consequences of right behavior so attractive that they compel attention, the battle is won in a great majority of cases. For the few that are left, the way of the transgressor is apt to be hard enough if the offender is allowed to feel the full weight of the consequences of his offense. If we stress the positive side of the proposition, we will plan our work upon the theory that pleasant experiences will be entered into vigorously and will probably be repeated. We will then tie up the experiences which are worth repeating with processes which are fascinating enough to inspire vigorous effort.

The *Industrial-Arts Magazine* quotes George H.

Knox as saying: "The real difference between those who succeed and those who fail is, the one thinks he can and the other thinks he cannot. The one discovers himself and the other does not. The one learns that he can do things and the idea arouses, thrills, inspires him; the other thinks that all great things were intended for some one else, so he misses the great experience, the great trials, and the great rewards."

The projects outlined in this book are offered in the sincere hope that they may suggest a compelling motive for work in the middle grades, and help to overcome the lure of the busy world outside of school, which attracts so many before they are prepared to meet its demands. It is hoped that through the provision of simple, yet interesting and thought-provoking occupations, which may be carried on in any school by any teacher, the liveliest boys may find school the happiest place they know, the timid children may discover themselves and know the joy of successful effort, and that each and all, both in school and out, may find the full measure of life's richest experiences.

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The Eskimo Twins	Perkins
The Japanese Twins	Perkins
The Dutch Twins	Perkins
The Mexican Twins	Perkins
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Around the World Series	Tolman
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How the World Is Fed	Carpenter
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